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THE WORLD BOOK

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In Twelve Volumes

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THEIR RESPECTIVE FIELDS

Volume Six

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THE WORLD BOOK

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VOLUME

SIX

HUSBAND AND WIFE, the term, both in a legal and a popular usage, for a man and a woman who are married to each other.

Common-Law Status. Under the old common law, which forms the basis of most laws to-day in England, Canada, and the United States, the husband and wife were accounted one person, and that one person was the husband. When a woman married, she became a part—and a minor part, at that—of her husband; she was *civiliter mortua*, which means *dead as a citizen*. Her property, unless it was most carefully and rigidly secured for her before marriage, became absolutely her husband's, and he might dispose of it or will it away as he chose. Her clothes were not her own, nor were her earnings or her children. She could make no contracts; she could not sue or be sued. For centuries she could not even have redress for wrongs or actual brutality at her husband's hands, since legally she was a part of him, and so she was entirely at his mercy. Any crime committed by a woman was charged to her husband; it was taken for granted that she had acted under coercion and by his orders. To-day the husband is liable for his wife's crime only when he is present and does not prevent it, or where he orders it committed.

The only circumstances under which a married woman was treated as a responsible person were in case she was married to an alien or a convict, or in the event that her husband had been banished. In that case, her property remained her own, she might enter into contracts, sue or be sued as a *feme sole*, the old legal phrase for a *single woman*.

Common-Law Survivals. Inevitably, there developed a tendency to modify the laws which discriminated so unfairly against women, to work toward a real equality. But progress in the direction of better laws has been slow, and it has been uneven; some of the states and provinces were long in the Dark Ages as far as fair legislation for women is concerned, and even in some progressive and enlightened communities, too many of the absurdities of the old common law may be yet found.

In connection with the facts recited below, it must be borne in mind that modern laws on the subject are far from uniform. The statements apply to the majority of conditions. To-day the husband still determines the place of residence; but since the introduction of divorce he

cannot force his wife to live in an unhealthy climate or under conditions which are too trying, for he lays himself open thereby to the charge of cruelty. But in some jurisdictions, the husband can lock his wife up to keep her from leaving him, forbid her to visit her family, compel her to go to a specified church, restrain her from squandering money, keep her from bad company, and punish her to a slight extent. Confined under such circumstances, the wife has no right of *habeas corpus* (which see). The wife has no corresponding rights over her husband's liberty. Wife beating, however, which once flourished, is now a severe charge against a husband.

Support and Earnings. A husband is bound to support his wife in a ratio with his income and ability, unless his wife has forfeited her right by misconduct, has waived it voluntarily, or is able to support herself. The wife, however, has no right to her husband's services, although in numerous jurisdictions the husband has the absolute disposal of his wife's time, services, and earnings.

Property Rights. In some jurisdictions, the woman's property automatically becomes her husband's with the conclusion of the marriage ceremony. By prenuptial settlement, the wife may have a separate estate; without such a settlement, the use, rents, and profits from his wife's real estate and all her personal property go to the husband. This is not true everywhere; in some states the wife's right to her own personal property is respected.

Husband's Liability. The husband is liable in some states for debts which his wife contracted before marriage. On the other hand, there are found laws declaring that the wife's property and her business or its profits may be attached by her husband's creditors.

The Wife's Dower Right. A husband can will the major part of his estate away from his wife, provided he leaves her one-third. This one third is called her *dower right*, and she can always sue successfully for it. The wife cannot will real estate or personal property unless it is her separate estate. In some states, again, while the wife can sue for her third of her deceased husband's property, the husband is entitled to all his deceased wife's estate at her death, no matter what may be the reading of her will; let it be noted that this is not true in all jurisdictions. This dower right of the wife to one-third of her husband's

realty holds good even during life, and it is necessary to get her consent and signature before he can dispose of such property in any way.

In some states, anything bought with money belonging to both husband and wife belongs to the husband. Personal apparel, unless the husband announces in actual words before witnesses that he presents it to his wife, is often, under the law, the husband's property. In some other states, the husband owns literally half of each article of his wife's clothing. Only an attorney can advise those interested in the particular facts as they apply to any state.

Husband and Wife as Witnesses. An interesting survival of old common-law spirit is that neither husband nor wife can be a witness against the other, except in cases where one is suing the other—usually for separation or divorce, but sometimes for civil injuries as well.

The Case of Joint Guardianship. A survival from the past which works injustice in these modern times is a provision in some states which deprives a wife of her rightful joint interest with her husband in their children. In spite of its obvious unfairness, in many states the father seems to be the only legal parent of a child. Limited only by the laws on compulsory education, employment of young children, etc., a father can put his child to work when and where he chooses, and has the sole right to its earnings as long as that child is a minor. One hundred fifty years ago, Blackstone said, "A mother, as such, is entitled to no power, but only to reverence and respect." Reverence and respect, however, without legal backing, are often not enough to help a mother to keep her minor child from being exploited by an unscrupulous father. Fortunately, in the century-and-a-half since Blackstone's time, this sentiment has been modified, and in many jurisdictions the mother has been endowed with a half-interest in her own child. See COMMON LAW; PARENT AND CHILD. E.D.F.

HUSKIES. See **ESKIMO DOG**.

HUSS, JOHN (about 1373-1415), a Bohemian religious reformer and martyr, to whom it was given to transmit from John Wycliffe to Martin Luther the torch which kindled the fires of the Protestant Reformation. Huss became a lecturer in the University of Prague in 1398, where two years previously he had received the degree of M.A. In 1401 he was ordained a priest, becoming a popular preacher and confessor to the queen of Bohemia. By this time the teachings of the English reformer Wycliffe had made a profound impression upon him, and his translations of Wycliffe's writings and spirited defense of his opinions stirred up the opposition of the university authorities, who forbade him to discuss the new doctrines.

Neither this prohibition nor the bull issued by Pope Alexander V in 1409 against Wycliffe's

teachings, nor the decree of excommunication directed against him and his disciples the following year, served to turn Huss from the path which he believed was leading him to the light. Affairs moved rapidly to a crisis. Huss boldly attacked numerous ecclesiastic policies, thereby widening the breach between him and the Church, and in 1414 he was summoned to appear before the Council of Constance to answer charges of heresy. On his arrival in Constance, Huss was arrested and cast into prison. On June 5, 1415, his case came to trial, and in the hearings before the Council, his doctrines were condemned and he was ordered to recant. He was not permitted to defend his views in open debate, and his plea that his advocacy of Wycliffe's teachings was not a renunciation of Roman Catholic doctrines did not satisfy his judges. The Council therefore found him guilty of heresy, and he was delivered over to the civil authorities to be burned at the stake. The sentence was carried out on July 6, and on the day of his execution, his ashes were thrown into the waters of the Rhine. The martyrdom of Huss caused sorrow and indignation throughout Bohemia, leading finally to the Hussite War. See **WYCLIFFE, JOHN**; **REFORMATION, THE**; **TORTURE**.

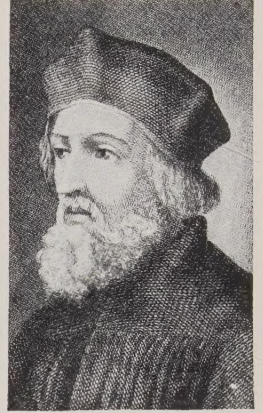


Photo: Brown Bros.

JOHN HUSS

Hussites, the name given to the disciples of John Huss. They were organized soon after his death by about 450 Bohemian nobles, who determined to avenge the death of their leader and show their defiance of the decrees of the Church. They inaugurated a vigorous civil war, and were many times victorious over forces sent against them by the Pope and Emperor Sigismund. Convents and churches were destroyed, and monks and priests were slain.

From the beginning of their organization, the Hussites were divided in doctrine into two factions; these were the *Calixtines*, or conservative party, who were more in sympathy with the Church; and the *Taborites*, who were radical in their rejection of religious doctrines and practices. A third party, called the *Orphans*, also developed. In 1431 the Council of Basel succeeded in coming to an agreement with the Calixtines, who then returned to the Church and acknowledged Sigismund as king. The Taborites and Orphans were completely routed in 1434, and eliminated as a political power; they finally became identified with the Bohemian Brethren.

HUSSAR, *huz zahr'*, a light-horse cavalryman or trooper, armed with carbine and saber.

This class of cavalry originated in Hungary in 1458, when they were organized to fight against the Turks, and the name was derived from the Magyar word *husz*, meaning *twenty*, the troops being levied by the taking of each twentieth man when the people were counted. The Hungarian hussars were famed for their courage, and wore a semi-Oriental dress which set the style of uniforms for the hussars of other nations. Nearly two-thirds of the cavalry in the British army a hundred years ago consisted of hussars and lancers. A hussar's original uniform comprised a high cylindrical cloth cap, jacket with heavy braiding, and a dolman, or sort of loose coat, hanging in a drape from the left shoulder.

HUSSEIN, *hoos sane'*, former king of Hejaz (which see). See, also, ARABIA; TRANSJORDANIA.

HUSSITES, the followers of John Huss (which see).

HUTCHINS, ROBERT MAYNARD (1899-), president of the University of Chicago, in succession to Max Mason. When he was elected to the post, in 1929, Hutchins was only thirty years old, and the fact of his youth was particularly stressed throughout the nation. His reaction to the widespread comment, wholly complimentary, was that, at the age of thirty, in his opinion, a man does not know much.

President Hutchins was born in Brooklyn,

N. Y., and was educated at Oberlin (O.) College and Yale University. From Yale he was graduated in 1921, two years later was given

the postgraduate degree of M.A., and in 1925 was graduated from the Yale Law School. From 1923 to 1925, he was secretary of the university, was a lecturer in the law school from 1925 to 1927, and then for a year, was professor and acting dean of the law school; in 1928 he became dean, but served only a year before being called to Chicago.

During the World War, Hutchins was in the ambulance service of the American army, and in 1918-1919 was on the Italian front; the Italian government decorated him with the *Croce*

de Guerra (the Cross of War).

HUTCHINSON, ANNE (about 1590-1643), a religious zealot in colonial America, born in Lincolnshire, England. She married William Hutchinson, and emigrated to Boston, in 1634, where she soon denounced the Massachusetts clergy, whose orthodoxy she questioned. Mrs. Hutchinson held meetings and lectured, and for her peculiar theological beliefs was banished from the colony for heresy. With a number of friends, she went to Rhode Island and started a settlement at Portsmouth, one of the principles of the new colony being that no one was "to be accounted a delinquent for doctrine." After the death of her husband, who shared her opinions, she removed to a new settlement in the colony of New York, where, in 1643,



AN OLD-TIME HUSSAR

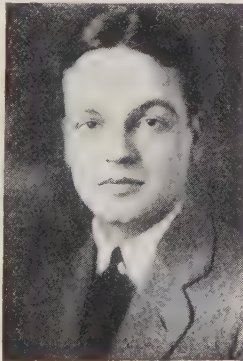


Photo: U & U

ROBERT MAYNARD
HUTCHINS

Youngest of America's university presidents.



Photo: Brown Bros.

ANNE HUTCHINSON

she and her whole family were taken prisoners, and all, excepting one daughter, were killed by the Indians.

HUTCHINSON, KAN. See KANSAS (back of map).

HUTCHINSON, THOMAS (1711-1780), the last royal governor of Massachusetts Bay colony, was the son of a merchant of Boston and was educated at Harvard. His political career began in 1737, when he was elected to the Massachusetts General Court. He took part in the Albany Convention in 1754, and was made chief justice of the colony in 1760. While occupying this office, he issued the famous Writ of Assistance. He opposed the Stamp Act, but considered it legal, and incurred the enmity of the colonists while he endeavored to enforce it. During this period his house was attacked by a mob, and manuscripts and books were destroyed. In 1769 he became acting governor, when Governor Barnard was sent to Virginia, and in 1771 received his commission as governor. Throughout his administration, he had friction with the colonists; in 1774, when General Gage was appointed military governor, he went to England to reside. His *Diary and Letters* was published in 1884, and in 1886 appeared his *History of Massachusetts Bay*, one of the best original sources bearing on the history of the colonial period. See WRITS OF ASSISTANCE.

HUXLEY, THOMAS HENRY (1825-1895), a famous English naturalist, the friend and supporter of Darwin in his exposition of evolution. After graduating from the University of London in 1845, Huxley entered the medical service of the navy. He spent four years on *H. M. S. Rattlesnake* on a surveying expedition in Australasia, where he had opportunity to study the anatomy and physiology of the transparent oceanic forms—jellyfish, pelagic mollusks, and worms. He sent a great many valuable scientific papers to the Royal Society while on the cruise, and when

the *Rattlesnake* returned in 1850, Huxley found that his papers had made him famous. In 1853 he retired from the navy.

In 1854 he accepted the post of lecturer on natural history at the Royal School of Mines. Soon after his return from the voyage of the *Rattlesnake*, he had made the acquaintance of Charles Darwin, and also that of the great botanist, Sir William Hooker. He met John Tyndall in a railway carriage on his way to a meeting of the British Association at Ipswich, in 1851, and they became warm friends. Huxley, Tyndall, and Hooker eventually became a triumvirate which governed and determined the official side of scientific affairs in London, influencing and directing public opinion.

At the age of twenty-five, Huxley had established a reputation as a comparative anatomist, palaeontologist, microscopist, and an exponent of original views on zoölogy. When Darwin's *Origin of Species* was published, Huxley exhibited a new activity in defending and expounding the views of his friend (see DARWIN, CHARLES). In 1883 he was elected president of the Royal Society. Two years later he retired from active life on account of ill health, but between that year and his death, in 1895, he published a great many brilliant essays, and his influence has endured to this day. The novelist Aldous Huxley is his grandson. See EVOLUTION.

His Writings. Among his works are *On the Theory of the Vertebrate Skull*, *The Oceanic Hydrozoa*, *Man's Place in Nature*, *On Our Knowledge of the Causes of the Phenomena of Organic Nature*, *Elementary Physiology*, *Elements of Comparative Anatomy*, *Introduction to the Classification of Animals*, *Critiques and Addresses*, *American Addresses*, *Physiography*, and *Anatomy of Invertebrate Animals*.

HUYGENS, hi' genz, CHRISTIAN (1629-1695), a Dutch mathematician, physicist, and astronomer, who is credited with the discovery of polarization and the wave theory of light, by which he was able to explain reflection, refraction, and double refraction. He constructed the first powerful telescopes, which enabled him to discover the true form of the ring around Saturn, and one of the important satellites. The application of pendulums to clocks was another of Huygens' achievements, and the spiral watchspring was one of his inventions. In 1659 he published a description of an important invention, the micrometer. His greatest work, the *Horologium Oscillatorium*, was published in 1673.

He was born at The Hague, and received his early education from his father, Constantyn Huygens, the most brilliant figure in Dutch literary history. By his twentieth year, he had already shown his mathematical genius, and in 1665, after he had been living in France for several years, his talents were rewarded by the patronage of Louis XIV. He was made a

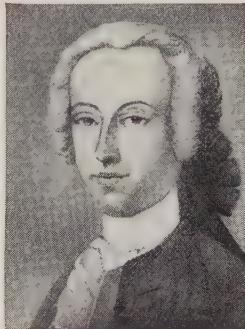


Photo: Brown Bros.

THOMAS HUTCHINSON

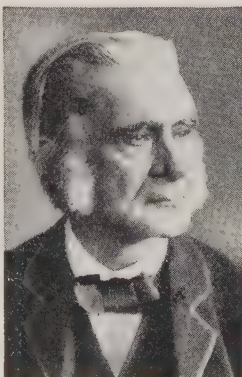


Photo: Brown Bros.

THOMAS HUXLEY

member of the Royal Society in England. Huygens' collected works were published by the Holland Academy of Sciences between 1888 and 1905. See LIGHT; POLARIZATION OF LIGHT.

HWANG, one of the two largest rivers of China, though it is commercially unimportant. By decision of the Geographic Board in 1920, the spelling *Hwang* was adopted in preference to *Hoang*. This river has earned the name of "China's Sorrow," on account of its liability to frequent disastrous flooding. The most serious flood took place in 1887, when an area of nearly 50,000 square miles was inundated, and nearly a million persons perished. Next to the Yangtze, the Hwang is the largest river in China, draining a basin with an area of more than 400,000 square miles. It rises in the marshy eastern district of north Tibet, and flows in a generally eastern direction until, after a course of 2,600 miles, it empties into the Gulf of Pe-chi-li, a western extension of the Yellow Sea.

The Hwang is also known as the Yellow River, with reference to the vast amount of yellow earth carried down by its waters. The sediment raises the bed so frequently that the course of the river makes many changes, cutting fresh channels in the soft earth. For centuries, dams and dikes have been maintained to lessen the danger of floods. Owing to its rapid current and the deposits of earth, the Hwang has little value as a commercial highway.

HYACINTH, *hi' a sinth*, a favorite spring flower of the lily family, whose blue, white, pink, or purple blossoms make a fine display in the garden during the months of March and April. It is grown from bulbs (see BULB). Introduced into Europe about the beginning of the sixteenth century, the flower speedily became popular with the English and the Dutch, and its cultivation assumed mammoth proportions in Holland. The soil and climate of that country are especially favorable to the production of bulbous-rooted flowers, and hundreds of acres are given over to the growth of hyacinths near Haarlem, bringing in a yearly revenue of many thousands of dollars. The flowers are drooping and bell-shaped, and both single- and double-flowered varieties are cultivated. In Shelley's poem, *The Sensitive Plant*, are these lines:

And the hyacinth purple and white and blue,
Which flung from its bells a sweet peal anew
Of music so delicate, soft, and intense,
It was felt like an odor within the sense.

The flowers are grown in open beds, in hot-houses, and in the home. When cultivated in the open, they require rich, well-drained soil. The bulbs are planted from September to November, about five inches deep, and in beds

spaded to a depth of twenty inches. The root attains its principal growth in the fall, and during the winter months, the beds are covered



The hyacinth for constancy, wi' its unchanging blue.—BURNS: *O Luve Will Venture In*.

with leaves or rotted manure. Early in the spring, when the flowers appear, the stems are tied to slender stakes to protect them from accident. In the summer, after the leaves have withered, the bulbs are taken up and stored in dry soil or sand. Florists, by potting the bulbs early in September, can force the plants to blossom by Christmas time. In the home, the flowers are grown in hyacinth glasses filled with water.

In Mythology. The hyacinth appears in a favorite old Greek myth, in which it is said to have sprung from the blood of the beautiful Spartan youth, Hyacinthus, the friend of Apollo. Zephyrus, jealous because Hyacinthus favored Apollo, caused the latter's quoit to strike and kill the youth while the two were at play. Grief-stricken, Apollo caused a purple flower to spring from the drops of blood that fell from the brow of Hyacinthus. B.M.D.

Scientific Name. The hyacinth described above is *Hyacinthus orientalis*, family *Liliaceae*. The genus

consists of about thirty species, natives of Africa and Asia.

HYADES, *hi' a deez*. See TAURUS.

HYATT, ANNA VAUGHN. See illustration of statue under JOAN OF ARC.

HYATT, JOHN WESLEY. See CELLULOID.

HYBRID, *hi' brid*, the offspring of parents of two distinct species, examples of which are found among plants, beasts, birds, fish, and insects. Among animals the most common and most useful hybrid is the mule, which is half ass, half horse (see MULE). The mule is an outstanding example of a sterile hybrid. While animal hybrids tend to be sterile, not all are infertile, and fertility among plant hybrids is fairly common. Hybrids are variable in transmitting hereditary characters, not reproducing true.

Hybridity has much greater practical value in plant than in animal breeding. The advantages of crossing plants are numerous, the most important being increase of size and vigor, greater hardiness and ability to resist disease, improvement of quality and flavor, and increased power of adaptability to different climates. A notable illustration of increase in size and vigor is furnished by the crossing of the English walnut and the California black walnut, which has a rate of growth double that of both parents combined. By the crossing of the common pear and the Chinese sand pear, the area devoted to pear-growing has been extended several hundred miles southward.

In France, when the grape industry seemed doomed to destruction because of the ravages of plant lice (see PHYLLOXERA), the grapes were saved by being crossed with an American species which was immune. A striking example of improvement in flavor is furnished by certain superior grades of smoking tobacco, the result of crossing the best quality of Havana tobacco with species having larger leaves. Potatoes have been made to double their yield per acre by means of the hybridizing process, and have also increased their content of starch from fifteen to twenty-six per cent. The remarkable success of Luther Burbank in crossing vegetables, fruits, and flowers is representative of what can be done by this method of plant breeding.

R.H.

Related Subjects. The reader is referred in these volumes to the following articles:

Botany	Burbank, Luther	Hereditv
Breeding	Cross-Pollination	Seeds

HYDERABAD, *hi dur ah bahd'*. See INDIA (Cities).

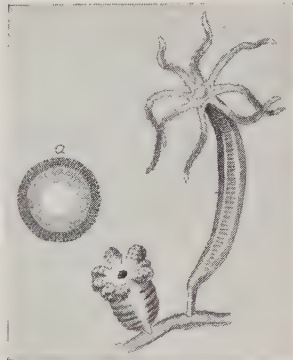
HYDRA, in Greek mythology, a monster which dwelt in Lake Lerna, in Argolis. It was credited with possessing many heads, of which the central one was immortal. The number of heads was stated originally as seven; any one of these being cut off was instantly replaced by two others, unless the wound was seared by fire. The destruction of this monster was the second labor of Hercules, and was accomplished with the assistance of Iolaus, who, as each head was cut off, cauterized the wound. The immortal head was buried beneath a huge stone. See HERCULES (The Twelve Labors).

HYDRA, FRESH-WATER, OR FRESH-WATER POLYP, *pol'-ip*, one of the simplest of the many-celled animals, an inhabitant of fresh-water ponds. It belongs to the same branch of the animal kingdom as the sea anemones, corals, and jelly-fishes (see COELENTERATA). The hydra has a cylindrical body, which is about as thick as heavy sewing cotton and from one-fourth of an inch to half an inch long. At one end of the body there is a disk-like expansion, or foot, with which the creature clings to bits of sticks, stones, and leaves in the water; at the opposite end is a mouth from which projects a circle of delicate threads, called tentacles, varying from five to

twelve or more in number.

If watched under a microscope, the hydra will seem to be continually changing in form. Sometimes it stretches out its tentacles until they look like long, delicate threads; at other times it contracts its tentacles and its whole body until it has the appearance of a tiny egg with a group of wartlike knobs at one end. It is also able to move slowly from place to place, by contractions of the disk, or may loop along a surface like a measuring worm. Hydras live on minute forms of aquatic life. Their tentacles are provided with many fine little stinging threads, which are shot into the body of the prey, like a miniature harpoon. These barbs have a paralyzing effect and the captured victim is soon mastered and drawn by the contraction of the tentacles into the mouth cavity.

Hydras propagate for the most part by budding. That is, tiny knoblike growths appear on the body of the parent animal, which, as they become larger, gradually acquire tentacles. When fully developed, they break off and begin existence anew as independent hydras. Hydras also reproduce by means of fertilized eggs, developed in temporary sex organs. One of the most interesting facts in connection with



HYDRA

One form of this strange water animal. The illustration shows a cross section of the body, outlining the two layers of minute cells which compose the body walls.

the hydra is its power of multiplying by division. As a rule, if a hydra is cut into two or more pieces, each portion will in time develop into a new animal. Many species of this animal have been identified, several of which are common in America. One is bright green. This color is due to the presence of tiny plant cells living within the inner cells of the body. Another is grayish-brown in color. S.H.S.

Scientific Names. The common American species of hydra are *Hydra viridis* and *H. fusca*.

HYDRANGEA, *hi dran' je ah*, a genus of ornamental shrubs of the saxifrage family, found in the Americas, China, and Japan (see



THE HYDRANGEA

SAXIFRAGE). The flowers vary from white to pink and bluish and are small individually, but they grow in large, showy clusters. When grown on some soils, the pink varieties will in time produce bluish blossoms. A hardy species much cultivated by nurserymen for landscape effects bears huge clusters of white flowers that bloom from the latter part of summer until fall. B.M.D.

Scientific Names. The botanical name of the white-flowered species mentioned above is *Hydrangea paniculata grandiflora*. A dwarfed variety grown in hothouses and popular for Easter decorations is *H. hortensia otaska*.

HYDRATE OF CHLORAL. See CHLORAL.

HYDRATES, in chemistry, are compounds made up of substances united with definite amounts of water. When certain substances crystallize from water solutions, they unite chemically with several molecules of water. The water thus combined is called *water of*

crystallization, or *water of dehydration*, and the compounds are *hydrates*. Such hydrates lose their molecules of water when heated, and become *dehydrated*, or *anhydrous*. The two forms differ. Crystals of copper sulphate represent a combination of the anhydrous salt (copper, sulphur, and oxygen) with five molecules of water. In this form they are blue. When the water of hydration is removed, the compound becomes a white or grayish powder. Substances which lose part or all of their water of hydration on exposure to air are said to be *efflorescent*.

In a restricted sense, the term hydrate is often applied to a metallic compound (called *hydroxide*) containing one or more hydroxyl groups (symbol *OH*). An hydroxyl contains one atom of oxygen and one of hydrogen, instead of the two atoms of hydrogen that enter with the one of oxygen into the composition of water. The atoms of such a group (called a *radical*) remain associated in chemical reactions, acting like a single atom. An hydroxyl does not exist free in nature, like the elements or the compounds, but enters into many combinations. It forms part of the large group of organic compounds known as alcohols. T.B.J.

HYDRAULIC CEMENT. See CEMENT.

HYDRAULIC ENGINE, a machine to utilize the power of falling water for the purpose of driving machinery, was first designed by Sir William Armstrong. It is most efficient when working under a full load, the effectiveness decreasing with the load. Three types are in use: (1) water-pressure engines or motors; (2) water wheels; (3) turbines (see WATER WHEEL; TURBINE WHEEL). Strictly speaking, only the first is a true hydraulic engine. It is similar to a steam engine, water under pressure being used instead of steam. The water is forced into a cylinder, pushing back the piston head until a sliding valve is opened by which it flows out. As only a small part of the water pressure is used in driving the piston, there is great loss of energy, and these engines are relatively inefficient, save when considerable power is wanted at low speed. These machines have been largely displaced by electric motors, but are still used occasionally for elevators and for pumping air for pipe organs.

HYDRAULIC PRESS. For one man to lift hundreds of tons would seem an impossibility, or at least to be a task requiring very complicated machinery. In truth, however, a mechanism scarcely more intricate than a pump can transform the power of the human arm into enormous pressure. This mechanism is the hydraulic press. Until the invention of more rapidly acting machinery, it was in general use for pressing cotton, paper, or hay into bales; for squeezing oil from cottonseeds; for punching holes in steel plates; and for other operations requiring unusual power of compression.

Its principle is also utilized for the hydraulic elevator, in which the ordinary pressure of water in city mains lifts the weight of a number of people. This form of elevator is now practically obsolete, having been succeeded by electrically driven machinery.

A hand-power hydraulic press is shown in the

four times 57,600 pounds, or 230,400 pounds, which is 115 $\frac{1}{2}$ tons.

Of course, the hydraulic press does not lift its load the entire distance in a single movement of the hand lever. If the small piston moves downward six inches, it displaces six cubic inches of water, but this amount spread beneath the 576 square inches of the larger piston will raise the latter only $\frac{1}{576}$ of six inches, or 0.010 inch. As soon as the stroke is completed, the valve *w* closes; when the handle is drawn up, more water enters through the valve *v*, and a second stroke can then be made.

HYDRAULIC RAM, a machine to use the momentum of falling water to lift water higher than the source of supply. In the diagram, water from the reservoir *r* flows through the pipe *p* and out through the valve *cv*. As the flow becomes faster, the pres-

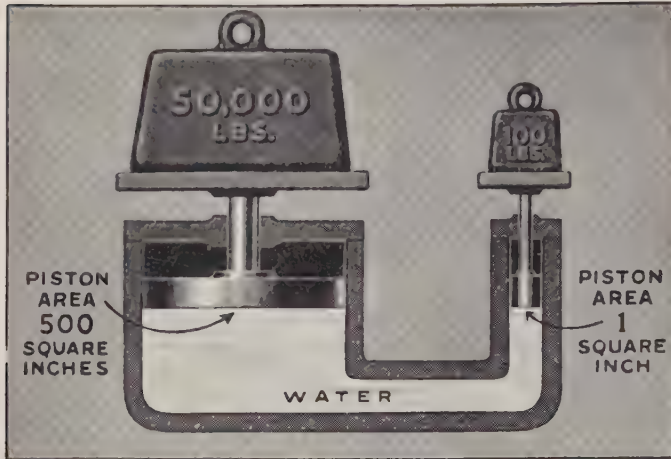
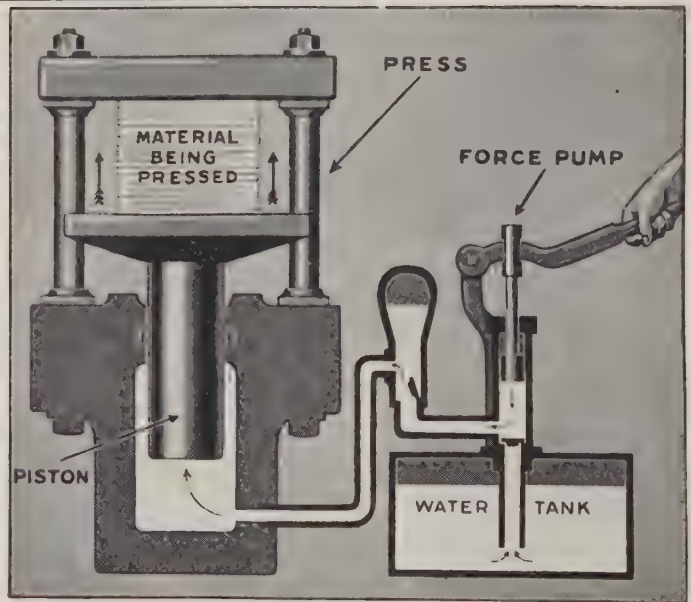


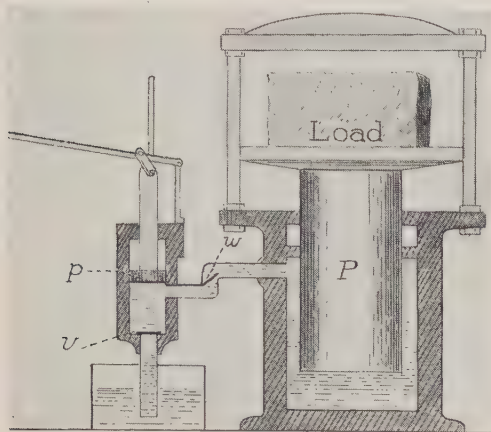
illustration. That part of the apparatus which contains the small piston is really a force pump (see PUMP); when the handle is pressed down, water or oil is forced past the valve *w*, and the piston *p* is raised. In the seventeenth century, the great physicist, Pascal, whose biography will be found in these books, discovered that if you exert pressure upon any part of a liquid enclosed in a vessel, an equal pressure will be exerted upon everything which the liquid touches, that is, the pressure is transmitted equally in all directions. If the area of the bottom of the smaller piston is one square inch, and the larger piston has a diameter twenty-four times that of the smaller, the area of the larger piston will be 576 square inches, each single square inch of which will receive pressure equal to that exerted on the square inch of water by the smaller piston. Thus, if the smaller piston exerts a force of 100 pounds, the larger piston *P* will receive a pressure sufficient to lift 576 times 100 pounds, or 57,600 pounds. If the handle of the small piston is made a lever with a mechanical advantage of four (see LEVER), a man exerting a force of 100 pounds can lift



THE MOST MODERN HYDRAULIC PRESS

sure closes the valve *cv*, suddenly checking the momentum of the water, as when the water from a hydrant is suddenly shut off. There is a back pressure which forces the water through valve *b* into the air chamber *a*. The air is compressed, and by its pressure closes valve *b* and forces the water in the chamber up through the pipe *e*. Since only a small part of the total water flowing through pipe *p* is forced

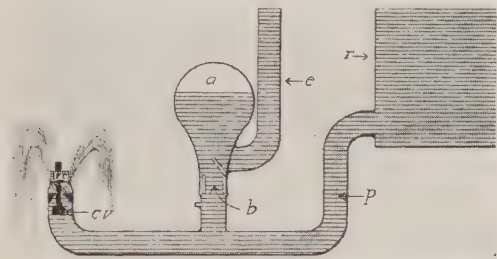
up through pipe *e*, the machine is not of practical value unless the source of supply is much greater than the amount needed. If the ma-



ONE FORM OF HYDRAULIC PRESS

The letters refer to the text, on page 3304.

chine were perfectly efficient, one-fifth of the water in *p* would be raised five feet in *e*; but, as there is much loss by friction and waste,



HYDRAULIC RAM

The letters which serve to explain its operation are referred to in the text.

an efficiency of fifty per cent is high, and even that is rapidly diminished if the ratio of the fall to the height raised becomes greater than one to twelve.

HYDRAULICS. When we open a faucet in our house to get a glass of water; when we see the embankments and levees which protect the lands along the banks of many rivers from disastrous floods; when we think of the great canals that have been built for improving communication by water; when we read of the great irrigation works which transform arid places into fertile plains or smiling gardens, we must remember that men have been able to accomplish all these works as the result of the knowledge they have gained about the natural laws that govern liquids in motion. The branch of physics which deals with the laws of liquids in motion is known as *hydraulics*, a name which is derived from the Greek, and

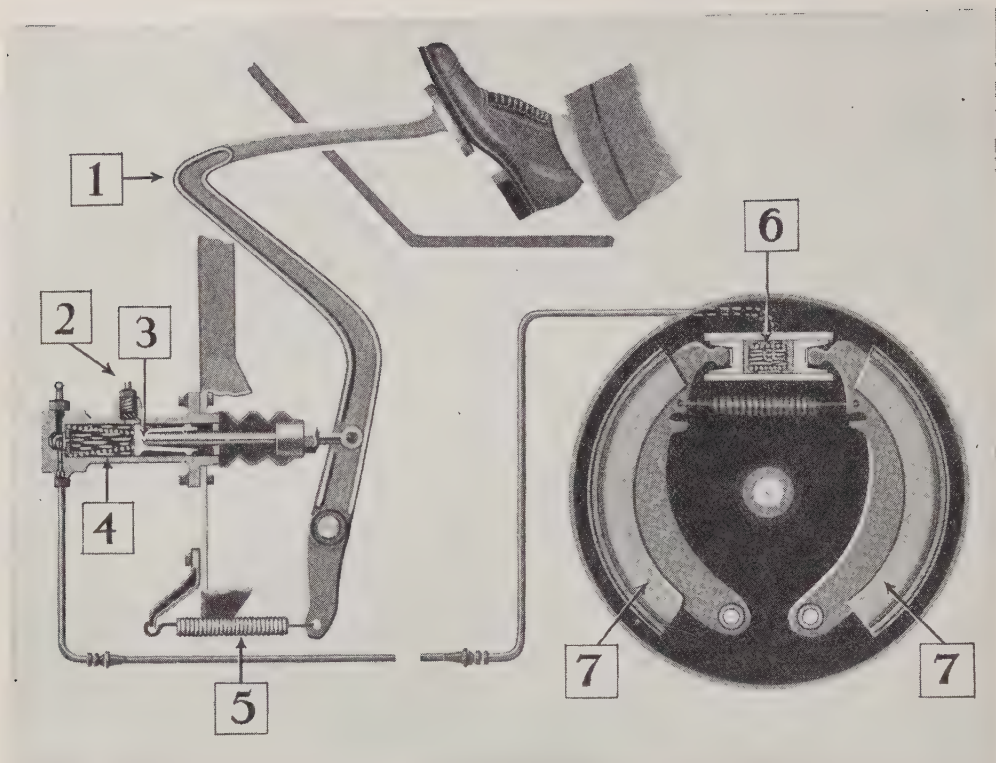
means *pertaining to water*. The practical application of the laws of hydraulics has given rise to the science of hydraulic engineering, to which we are indebted for all the benefits named above.

Laws of Flowing Liquids. In this article can be given only a few of the fundamental laws to which liquids in motion are subject. When water descends or flows, it is subject in theory to the same laws as all falling bodies (which see). If a hole is made in the side of a vessel containing water, the water flows out of the hole, or orifice, forming a jet. One important physical law regarding a jet of water is the following: The velocity with which a jet of water issues from the orifice is equal to that of a body falling from the surface of the water to the orifice. A descending jet of water will therefore acquire the same velocity that a stone would acquire in falling from the high level of the descending jet to the ground. A jet which issues from a dam through an orifice made ten feet below the surface of the water will have the same velocity as a stone which has fallen ten feet. It follows that the velocity with which a jet flows depends on the height of the liquid above the orifice.

Another important law is the following: A jet of water will rise to the level of its source. If a tank is on a support twenty-five feet high, and a pipe leading to the ground and having the lower end bent upward is attached to it, a jet issuing from the pipe will rise theoretically as high as the surface of the water in the tank, that is, twenty-five feet. But on account of the resistance of the air, and the friction of the liquid against the sides of the pipe, the water never rises quite as high.

Flow of Water in Rivers. Water flows in a current, as in rivers, on account of the inclination of the channel. An inclination of three inches per mile is sufficient to give motion to water and to produce a velocity of three miles an hour. But the flow is also affected by the form of the channel, as well as by the friction along its banks and the bottom. Thus the current in a river moves more swiftly at the center, where there is less friction, than near the shores or the bottom.

Water Supply of Cities. The necessity of providing a pure and plentiful supply of water to cities is one of the many instances in which the science of hydraulic engineering has to solve various difficult problems. The water-works of some of the big cities are marvelous feats of engineering, which compel admiration for the knowledge, skill, and ingenuity of the engineers who planned and constructed these works. The chief problem which had to be solved in any of these undertakings is how to convey the water from the source to the place where it is to be used. Sometimes the water has to be carried over great distances, and this



HYDRAULICS APPLIED TO THE AUTOMOBILE

The hydraulic brake for motor vehicles has supplanted mechanical brakes in many kinds of automobiles. The above illustration explains its action. (1) The foot brake pedal, where power is applied. (2) Master cylinder supply tube connection. (3) Piston. (4) Liquid. (5) Pedal return spring. (6) Wheel cylinder. (7) Brake shoes. The fluid is compressed, and the compression extends through pipes to the wheel cylinder, where expansion of the brake causes the necessary friction to stop the vehicle.

necessitates the construction of large aqueducts, reservoirs, and other similar works. Then comes the problem of distributing the water in the city over a wide area by means of a great number of pipes of various sizes, which bring it into the homes of the people. These pipes must be arranged in such a way that they shall always contain a constant flow of water under the proper pressure. Another problem which has to be solved is to furnish enough pressure to force the water to the top of tall buildings. In cities like Denver and Los Angeles, which are situated near the mountains, the water is conducted to the city in large pipes from reservoirs built on the mountains. As water tends to rise to the level of its source, it will rise in the buildings to the height of the reservoir. This is known as the *gravity system* of waterworks. But in most cities, such as New York, Boston, Philadelphia, and Chicago, a special system of pumping has to be employed, in order to attain a result achieved thus easily in mountainous country.

Various machines for using the force of falling water have been constructed, and most of

them are described in these volumes under their proper headings.

A.L.F.

HYDROAEROPLANE, *hi dro air' o plane*, OR **HYDROPLANE**. See AIRCRAFT.

HYDROCARBONS, *hi dro kahr' bonz*, are compounds of carbon and hydrogen. Some of them occur in nature as natural gas, petroleum, turpentine, asphalt, etc. Others are made artificially. The commercial products of petroleum, such as benzine, gasoline, kerosene, lubricating oils, and paraffin wax, are mixtures of hydrocarbons. Coal gas contains hydrocarbons, and they are found in the by-products obtained in the manufacture of gas from coal. Acetylene, also used as an illuminating gas, is a hydrocarbon. The dangerous "fire damp," which is the cause of many dreadful explosions in mines, is the hydrocarbon *methane*, which is also the principal constituent of natural gas and an important one in coal gas.

In chemistry, the hydrocarbons are of great theoretical interest. It is the common practice to regard all the compounds of carbon as "derived" from the hydrocarbons. This does not mean that all such compounds are

actually made from hydrocarbons, but only that it is convenient to classify them according to their theoretical relationship to the hydrocarbons. For this reason, *organic chemistry*, the branch of the science which treats of the compounds of carbon, is often defined as "the chemistry of the hydrocarbons and their derivatives."

Hydrocarbons are divided into two great classes, known as *aliphatic* and *aromatic*. Methane, acetylene, and the petroleum hydrocarbons belong to the former group, which takes its name from the Greek word *aliphe*, meaning *fat*, fats being derivatives of hydrocarbons of this class. The coal-tar products belong to the aromatic group (*aroma*, a *pleasant odor*). Examples are benzene (a different substance from benzine), naphthalene (familiar as moth balls), and anthracene. It is principally from these aromatic hydrocarbons that coal-tar dyes are made.

T.B.J.

Related Subjects. The reader is referred in these volumes to the following articles:

Acetylene	Carbon	Coal
Aniline	Chemistry	Coal Tar

HYDROCHLORIC, *hi dro klo' rik*, **ACID**.

See HYDROGEN CHLORIDE.

HYDROCYANIC, *hi dro si an' ik*, **ACID**.

See PRUSSIC ACID; ALMOND.

HYDROCYANIC-ACID GAS. See INSECTICIDES AND FUNGICIDES.

HYDROELECTRIC POWER. See WATER POWER.

HYDROFLUORIC, *hi dro floo or' ik*, **ACID**, the only known compound of hydrogen and fluorine, is a very poisonous acid, found in liquid form or as a colorless gas. It is chiefly used for etching on glass, and in chemistry in the analysis of substances containing silica, which it changes into vapor. It attacks most metals violently, but will not affect lead; it is therefore stored in lead, wax, or gutta-percha containers. Even when highly diluted with air, it is injurious to the lungs, while to breathe the pure vapor means death. In etching, the plate to be etched is coated with wax, the design is scratched through to the glass, and the plate is exposed to the acid. When the wax is melted off, the design is found bitten into the glass. See FLUORINE. T.B.J.

Chemical Formula. The formula for hydrofluoric acid at 190.4° F. is HF; that is, a molecule contains one atom each of hydrogen and fluorine. At ordinary temperatures, the gas is denser, and its formula is then H₂F₂.

HYDROGEN, *hi' dro jen*, a tasteless, odorless, colorless gas, the lightest substance known. Hydrogen is a non-metallic element, with the chemical symbol *H*. It is of great importance to man, for it is found in almost every organic compound, including water, plant and animal tissues, wood, paper, starch, fats, petroleum

products, all acids, and many other chemical substances. Free, or uncombined, it occurs in natural gases, decayed tissues, meteorites, and in the air. There are enormous volumes of hydrogen in the sun's atmosphere.

Hydrogen may be prepared by decomposing water with electricity; by passing steam over red-hot iron; and in other ways. It is the *one essential element in all compounds having acid properties*, and may be obtained by the decomposition of a mineral acid by a metal. It has great affinity for oxygen, with which it forms water, and also hydrogen peroxide. A mixture of hydrogen and oxygen ignited by a flame or an electric spark explodes most violently. Hydrogen is called a reducing agent because of its power of withdrawing oxygen from compounds containing large proportions of that element (see OXIDATION). Thus, if hydrogen is passed over heated iron rust, the rust is reconverted into iron.

Hydrogen burns with a very hot, colorless flame, but other substances will not burn in it. The oxy-hydrogen flame is an application of its affinity for oxygen to operations where very great heat must be obtained (see LIME-LIGHT). Hydrogen will not support life, although breathing it is not directly injurious. It has the effect of raising the pitch of the voice to a high, thin squeak. Because of its buoyancy, it has been extensively used to inflate balloons and dirigible airships, but since it is a dangerous explosive, it is giving way to helium (which see).

Hydrogen is also used to convert liquid fats into more valuable solid fats. This process is called *hydrogenation*.

Modern research in physics and chemistry has shown that it is extremely probable that hydrogen is the common stuff of matter, and that all other elements are hydrogen atoms in varying combinations. This conception of matter was advanced by an English chemist, Prout, many years ago, but not until recent years have his ideas been accepted in scientific works. See CHEMISTRY (The Elements). T.B.J.

HYDROGENATION, *hi dro jen a' shum*. See HYDROGEN.

HYDROGENATION OF OILS. See ADULTERATION OF FOODSTUFFS AND CLOTHING (Butter and its Substitutes).

HYDROGEN CHLORIDE, *klo' ride*, is the only known compound of hydrogen and chlorine. It is a pungent, fuming, colorless gas, one and one-fifth times heavier than air. It dissolves easily in water, and the solution is the commercial hydrochloric, or muriatic, acid. Hydrochloric acid occurs in the gases of volcanoes and in the water of rivers flowing through volcanic regions. It is found also in very dilute form in the digestive juices of men and animals, and hence is sometimes given as a tonic. It attacks most metals, evolving hy-

drogen and forming the chloride of the metal. A mixture of hydrochloric and nitric acids in the proportion of three or four to one is called *aqua regia*, meaning *royal water*, because it will dissolve gold, "the king of metals."

Hydrochloric is one of the strongest (or most active) acids, and with the exception of sulphuric, it is the cheapest. It is obtained as a by-product in the manufacture of soda from salt, and is used largely for the production of the elementary gas chlorine (which see) and of the chlorides of the metals. It finds employment also in dyeing and in the manufacture of dyes, in the treatment of bones for the production of glue, gelatin, and boneblack, and in many other industrial processes. T.B.J.

Chemical Formula. The formula of hydrogen chloride is HCl; that is, a molecule consists of one atom each of hydrogen and chlorine.

HYDROGEN PEROXIDE, also known as **HYDROGEN DIOXIDE**, **PEROXIDE OF HYDROGEN**, or **OXYGENATED WATER**, is a compound of oxygen and hydrogen containing twice as much oxygen per pound of hydrogen as does water. Because it contains more oxygen than the normal compound water, it is very unstable, easily giving up oxygen and becoming water. Oxygen so set free is called *nascent* (newborn), and is very active chemically, uniting easily with other substances with which it comes in contact; for instance, black lead sulphide is oxidized to white lead sulphate (see **OXIDATION**). This property makes hydrogen peroxide valuable as an antiseptic in medicine, and as a bleaching agent, especially for hair, feathers, and ivory, which are injured by cheaper bleaching agents. Hydrogen peroxide is commonly sold as a three per cent solution in water. The pure substance is rarely made. It is a colorless liquid, heavier than water, and is difficult to keep on account of its tendency to decompose. T.B.J.

Chemical Formula. The formula for hydrogen peroxide is H_2O_2 ; that is, a molecule contains two atoms each of hydrogen and oxygen.

HYDROGEN SULPHATE, *sul' fate*. See **SULPHURETED HYDROGEN**.

HYDROGEN SULPHIDE, *sul' fide*. See **SULPHURETED HYDROGEN**.

HYDROGRAPHIC, *hi dro graf' ik*, **CHART**. See **CHART**.

HYDROGRAPHIC OFFICE. See **NAVY, DEPARTMENT OF THE**.

HYDROGRAPHY, *hi drog' ra fie*, that branch of physical geography which treats of the surface waters of the earth. It is concerned with determining and making known the condition and depth of navigable waters, both oceanic and inland, and the making of charts and maps showing the coast formation, channels, reefs, rocks, currents, tides, and winds. The United States Coast and River surveys are con-

ducted under the direction of the Coast and Geodetic Survey at Washington. This service is very important to the commercial and marine interests of the country. Great Britain has a very thorough and extensive governmental department of hydrography. There is a hydrographic office in the Canadian Department of Marine and Fisheries. R.H.W.

HYDROMETER, *hi drom' e tur*, an instrument to determine the density of liquids. It consists usually of a slender sealed glass tube with a bulb at one end containing mercury or shot, but may have a cup at the end to hold the weight. The weight is required to hold the instrument in a vertical position in the liquid. The depth to which the instrument sinks in water is marked zero, and the rest of the stem is scaled like a thermometer. In any liquid other than water, it sinks to a depth greater or less than it would in water; the density of the liquid may thereby be read. Hydrometers used to test the purity of milk are called *lactometers*; of alcohol, *alcoholometers*; and the strength of the brine in the boilers of seagoing ships, *salinometers*. One type of hydrometer is made especially to test storage batteries. See **GRAVITY, SPECIFIC**.

HYDROPHOBIA, *hi dro fo' bih ah*, also called **RABIES**, *ra' bi eez*, is an acute disease of man and animals usually transmitted to man by the bite of an infected dog. It is caused by an organism present in the saliva of a rabid animal, but the exact nature of the virus is unknown. It is not large enough to be visible through the microscope. That it is small enough to pass through the pores of a filter is known from the fact that infective material from a diseased animal, secured by filtration, is capable of causing the disease in another animal. In the central nervous system of rabid animals, small bodies resembling protozoans (animal organisms) are present. Whether or not these so-called *Negri* bodies are the cause of hydrophobia, their presence is a sure indication of infection in suspected cases. The diagnosis is made by laboratory examination of the brain.

The first symptoms of hydrophobia in human beings are difficulty in breathing and inability to swallow, not only water but even saliva. Muscular spasms, with intermittent periods of mental excitement, mark the course of the disease, which always terminates in paralysis and death. The average duration of the disease is five days.

Prevention. Fortunately for humanity, hydrophobia can be prevented in nearly all cases by the Pasteur treatment (see **PASTEUR, LOUIS**). As soon as possible after the person is



bitten, he should have the wound or wounds cauterized by a physician, and treated with fuming nitric acid. The importance of this treatment lies in the fact that it lengthens the period of incubation, and prevents local infection of the bite. When such prompt measures are taken, Pasteur treatment may be started any time within two weeks. Treatment consists of inoculations of vaccine administered once daily for fourteen days or more.

The dog should be secured, if possible, and the facts should be reported to the health department. If the dog is captured, it should be fastened securely in a room or cage and kept under observation for two weeks. If it has hydrophobia, the symptoms which it shows will make the diagnosis by a veterinarian possible. If, at the end of two weeks, the dog is normal, it can be muzzled and released from confinement. If it develops symptoms of rabies, it should be killed without injury to the head. The head, severed from the body, is sent to the laboratory for examination for Negri bodies.

To prevent rabies, dogs should be licensed. All stray dogs should be taken to the pound and killed. Dogs should always be muzzled. None should be imported except under state control. Cats as well as dogs are capable of infecting by bites and scratches, and children should never be permitted to fondle sick animals. W.A.E.

[The name hydrophobia means *fear of water*, and was applied from a mistaken idea that a "mad" dog is afraid of water.]

HYDROPHONE, *hi' dro fone*. See MASON, MAX.

HYDROPLANE. See AIRCRAFT.

HYDROSPHERE, *hi' dro sfeeer*. See EARTH (Parts of the Earth); GEOLOGY (Work of the Hydrosphere).

HYDROSTATIC, *hi dro stat' ik*, **PRESS.** See HYDRAULIC PRESS.

HYDROSTATICS, *hi dro stat' iks*, the term now generally applied to the laws that govern fluids at rest; that is, the laws of liquid and gas pressure. Formerly, the study of gas pressures was known as *pneumatics*.

(1) The primary law of hydrostatics is Pascal's theorem, *that fluids transmit pressure equally in all directions*. This is easily shown with water, which is far less compressible than a gas. If a bottle whose neck has an opening one square inch in area is filled with water, and a weight of one pound is placed upon the cork, the pressure of the water over each square inch of the inside of the bottle is one pound; or, there is a total pressure of as many pounds as there are square inches on the inner surface of the whole bottle.

(2) The second law is *that the pressure at any point in a liquid is proportional to the vertical depth of the point and independent of the shape of the vessel*. The shape is not important, for

by the first law, pressure is equally distributed in every direction. This must be taken into account in the construction of high reservoirs or in harnessing water to drive hydraulic engines. The law is true only to the degree that the liquid is incompressible.

(3) The third law, known as Archimedes' principle, states *that the apparent loss of weight of a body placed in a fluid is equal to the weight of the fluid displaced; or, a body is buoyed up by a force equal to the weight of the fluid displaced*. When the upward, or buoyant, force is more than the weight of the body submerged, the latter rises until the buoyant force and the weight are equal. Then the body floats. In other words, a floating body displaces its own weight of the liquid in which it is floating.

Gas Laws. The first and third laws stated above apply to gases as well as to liquids, but the second does not. Owing to the fact that gases are very compressible, the pressure at a point does not vary as the depth of the point. Gases have no surface of their own, and depth has no meaning. For instance, we do not know the depth of the earth's atmosphere, although we know the pressure. The two most important gas laws are those of Charles and Boyle.

Charles' Law states that, if the pressure on a given mass of gas is kept constant, the volume of the gas is directly proportional to its absolute temperature. Absolute temperatures are temperatures expressed in the absolute scale, in which the zero is 273 degrees below Centigrade zero. Absolute zero is the theoretical point at which the volume of a gas would become zero, if cooled to that point. To change a given temperature from the Centigrade to the absolute scale, we add 273 degrees to the Centigrade reading.

Boyle's Law, sometimes called *Mariotte's Law*, states that, if the temperature of a given mass of gas is kept constant, the volume of the gas is inversely proportional to the pressure. This is the same thing as saying that the pressure times the volume of a gas remains constant so long as the temperature is kept constant. A.L.F.

Problems. To illustrate pressure of liquids:

In problems of this nature, a distinction is made between pressure of the liquid and the total force exerted against a surface by the liquid. The pressure is the *push per unit area*, as pounds per square inch or square foot, or grams per square centimeter, etc. The force is the total push on the surface pressed upon, and is expressed in pounds, grams, kilograms, or other unit of weight.

Force = pressure times area.

Pressure = depth times density.

Density = pounds, grams, etc., per cubic unit.

(1) A swimming tank 50 feet square is filled with water to a depth of 12 feet. Find the total force on the bottom and on a side.

Solution. Each square foot of the bottom of the tank supports a column of water 12 feet high, the



ILLUSTRATING THE THREE LAWS OF HYDROSTATICS

volume of which is 12 cubic feet. Since the density of water is 62.4 pounds per cubic foot, the weight of this column of water is 12×62.4 pounds, or 748.8 pounds. Then the pressure at the bottom per square foot is 748.8 pounds. Since the total force on the bottom is pressure times area, this force = $50 \times 50 \times 748.8$ pounds, or 1,872,000 pounds, or 936 tons.

Sidewise pressure increases gradually from zero at the surface of the liquid to its greatest value at the bottom. Therefore the average sidewise pressure is equal to the pressure halfway down, and

$F = \text{area} \times \text{average pressure.}$

Thus the total force on one side of the tank = $50 \times 12 \times \frac{12}{2} \times 62.4 = 224,640$, number of pounds, or 112.32 tons.

(2) To illustrate buoyant effect of liquids:

A piece of metal weighs 80 pounds in air and 70 pounds in water. When immersed what volume of

water does it displace, and what is its density (pounds per cubic foot)?

Solution. Mass of water displaced = loss of weight of metal = $80 - 70 = 10$, number of pounds.

Since 1 cubic foot of water weighs 62.4 pounds, a mass weighing 10 pounds will have a volume of $\frac{10}{62.4}$ cubic feet.

Volume of water displaced = volume of metal, or $\frac{10}{62.4}$ cubic feet.

Density of metal = weight in air divided by volume = $80 \div \frac{10}{62.4} = 499.2$, number of pounds per cubic foot.

(3) If a river ferry boat weighs 400 tons, what volume of water will it displace after taking on board a load weighing 300 tons?

Solution. 400 tons + 300 tons = 700 tons, or 1,400,000 pounds, combined weight of boat and load.

Since weight of floating body = weight of water displaced, 1,400,000 pounds = weight of water displaced after boat is loaded.

62.4 pounds = weight of 1 cubic foot of water. Then 1,400,000 pounds of water will have a volume of $\frac{1,400,000}{62.4}$ cubic feet, or 22,435.9 cubic feet.

(4) A rectangular block is 20 centimeters long, 5 centimeters wide and 4 centimeters high. When it is floating in water there is 1 centimeter of its height above water. How much does it weigh?

Solution. Section below surface of water is 3 centimeters high, and has a volume of $20 \times 5 \times 3$ cubic centimeters, or 300 cubic centimeters.

Therefore the volume of water displaced is 300 cubic centimeters.

Since 1 cubic centimeter of water weighs 1 gram, 300 cubic centimeters weigh 300 grams.

Since a floating body displaces its own weight of the liquid, the block must weigh 300 grams.

(5) To illustrate gas pressures:

Boyle's law is expressed mathematically as follows:

$\frac{V}{V'} = \frac{P'}{P}$, or $PV = P'V'$, where V is a given volume of gas subjected to a definite pressure, P , and V' is the changed volume when the pressure changes to P at constant temperature.

A volume of gas of 100 cubic inches under a pressure of 400 pounds per square inch is permitted to expand temperature kept constant until the pressure is 30 pounds per square inch. What is the new volume?

Solution. $P = 400$, $V = 100$, $P' = 30$. Find V' .

Since $PV = P'V'$,

$400 \times 100 = 30 \times V'$ or

$40,000 = 30V'$ and

$V' = 1,333\frac{1}{3}$, number of cubic inches.

(6) One hundred cubic inches of air at a pressure

of 15 pounds per square inch are compressed to 50 cubic inches. What is the new pressure?

Solution. $P = 15$, $V = 100$, $V' = 50$. Find P' .

$15 \times 100 = 50 \times P'$.

$1,500 = 50P'$.

$P' = 30$, number of pounds per square inch.

(7.) To illustrate Charles's law:

This law is expressed mathematically by the formula

$\frac{V}{V'} = \frac{T}{T'}$, where V and

V' represent the volumes of a certain quantity of gas at different absolute temperatures, pressure remaining constant.

A quantity of gas occupies 350 cubic centimeters at 15°C . What volume will it occupy at 2°C ?

Solution. $V = 350$; T (absolute temperature) = $273 + 15$; $T' = 273 + 2$.

Then $\frac{350}{V'} = \frac{288}{275}$ and $288V' = 96,250$.

Whence $V' = 334.2$, number of cubic centimeters.

Related Subjects. The reader is referred in these volumes to the following articles:

Archimedes
Centigrade

Expansion
Gas

Gravity, Specific
Thermometer

HYDROSULPHURIC, *hi dro sul fu' rik*,
ACID. See SULPHURETED HYDROGEN.

HYDROTHERAPY, *hi dro thehr' a pih*, the systematic use of water at varying temperatures, and with varying methods of application, for the relief of diseased conditions. As an aid to internal surgical treatment, it is to be considered of value and has been of service in kidney and liver troubles, nervous disorders of obscure origin, skin troubles, and those affecting nutrition. The term includes internal as well as external application of water, which, accordingly, may be swallowed, used as an injection into various body cavities, or applied externally, hot or cold, locally or generally, as the needs of the patient demand. Water treatment is administered at such well-known European watering places as Marienbad, Carlsbad, Ems, Vichy, and Bath, and patients may test the virtues of hydrotherapy in America at Mount Clemens and Battle Creek, Mich.; Hot Springs, Ark.; Hot Springs, Va.; Colorado Springs, Colo.; Saratoga Springs, N. Y.; French Lick and West Baden, Ind.; and other places of less renown. See BATHS AND BATHING (Baths for the Sick); MINERAL WATERS. W.A.E.

HYENA, a skulking, wolflike animal, whose wild howl, sounding like the shrieking laugh of a maniac, fills the listener with terror as it prowls about after dark in search of food. The most marked physical attribute of this

animal is its powerful jaws, which can easily break the bones of an ox, although its main food is the flesh of dead animals. It will crack open bones to get at the marrow when other food is lacking.

The hyena has prominent, ferocious eyes, long, erect ears, and very short hind legs which give its body an awkward,

humpbacked appearance. There are three species, all of which have long, brown, coarse hair, but are distinguished by their markings. The most typical and familiar form is the *striped hyena*, which roams through Southern Asia from Abyssinia to India, while the two others, the *spotted* and the *brown*, are found over much of Africa, south of the Sahara Desert. All three species have a very dis-



THE STRIPED HYENA



IN CHARACTERISTIC SURROUNDINGS

The hyenas are attracted to the carcass of an animal killed by hunters.

agreeable odor. They compose a separate family of the carnivores, or flesh-eaters (see CARNIVOROUS ANIMALS.)

M.J.H.



THE SPOTTED HYENA

Scientific Names. Hyenas constitute the family *Hyaenidae*. The striped hyena is *Hyaena hyaena*. The brown is *H. brunnea*; the spotted, *Crocuta crocuta*.

HYGEIA, *hi je' yah*, in Greek mythology, the goddess of health and the daughter of Aesculapius, with whom she was worshiped at Athens, Corinth, and elsewhere. She is represented in art accompanied by her father, or sometimes alone, with a snake at her side, the symbol of

healing power delegated to her from Apollo. Originally, Hygeia was an independent goddess, but later was merged with other deities who were identified with the cure of disease. The name is from the same Greek root as *hygiene*. See AESCULAPIUS.

HYGIENE, *hi' jih een*, or *hi 'jeen*, the branch of medical science which concerns itself with the preservation of health. Though it does not include the practice of medicine or of surgery, it is regarded as a branch of medical science because it has to do with the prevention of disease. Medicine is administered and surgical operations performed to make the sick well; the well apply the laws of hygiene in order to keep well.

Hygiene may be divided into four main branches: personal, domestic, public, and military hygiene.

Personal Hygiene. To live hygienically, one must understand the needs and character of his physical organism. First of all, he must know how to select his daily food, for good health depends primarily on proper nourishment. The elements, nutritive value, and digestibility of the foods in common use are fully treated in these volumes in the articles **FOOD** and **DIET**. Closely connected with the subject of foods is that of beverages. Tea and

coffee are both stimulants, but neither has nutritive qualities. The excessive use of either is to be avoided, especially by the young, as much as indulgence in wine, beer, distilled liquors, and narcotic drugs. Every person who desires to keep well should drink at least six glasses of pure water each day, one on rising, two between breakfast and luncheon, two between luncheon and dinner, and one on retiring. The moderate drinking of water at meals is also advocated by many physicians.

The selection of clothing is another factor in personal hygiene. One should vary his dress according to his age, occupation, and the season of the year. Common sense requires that rubbers be worn in damp weather and that warm garments be chosen for the cold months. The clothing should not be too tight-fitting, nor should it in any way restrict the freedom of the bodily movements or the circulation. Women and girls should shun extremely high heels, which throw forward the weight of the body to an abnormal degree.

Everyone who works indoors the greater part of the day should take some form of daily exercise, preferably in the open air. Physical activity is a necessity if the bodily organs are to develop properly and carry on their functions regularly. Rest and sleep are equally important. The person who is weakened by overwork and insufficient sleep is in just the condition to succumb easily to disease. An adult should sleep at least eight hours a day, as a rule, and care should be taken to have the sleeping room thoroughly ventilated. No one who sleeps in stagnant air can rest properly.

Personal cleanliness is all important. Unless the entire body is bathed frequently, the oil and waste products secreted by the glands of the skin will clog up the pores and prevent the skin from doing its share of eliminating waste matter. The hair, nails, nose and mouth cavities, and teeth should all be looked after carefully. Inasmuch as dirt and dead particles of skin are continually being rubbed off on the clothing, the garments worn next to the skin should be changed frequently, and the clothing worn during the day should always be removed when one goes to bed.

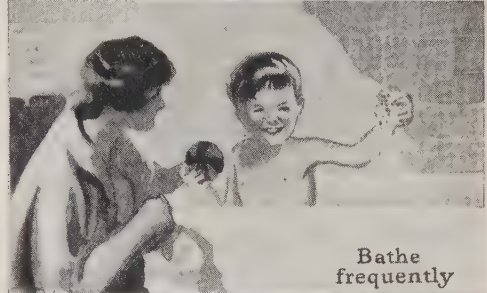
Domestic Hygiene. This division covers the hygiene of the home, and includes such matters as the preparation of meals, the cleaning and airing of rooms, ventilation and heating, and the care of invalids and children. When a household is conducted according to the principles of hygiene, it is safe to expect that the health and happiness of the members of that household will be well guarded.

Hygiene in Schools. See EDUCATION (Hygiene of Education).

Public Hygiene. The health of the public is a subject which received little attention until the beginning of the nineteenth century. The



Exercise in
the open air



Bathe
frequently



Drink plenty
of pure water



Keep the feet warm and dry



Sleep eight
hours a day

terrible epidemics that formerly swept away vast numbers of victims throughout the world (see CHOLERA) are a proof of the deplorable ignorance that once prevailed concerning sanitation and its benefits. Each town or city now has its department of public health. It is the duty of the health department to see that the drainage, water supply, and ventilation of buildings are up to the modern standard of excellence, that streets are kept free from filth, garbage and other refuse disposed of, street cars and other public conveyances kept in a sanitary condition, and that laws respecting vaccination and quarantine are enforced. In general, boards of health are established to safeguard the health of the community in every possible way.

Military Hygiene has to do with the preservation of the health of the soldier. When large numbers of men are in camp or on the battlefield, the problem of maintaining sanitary conditions is very serious. The remarkable progress made in military sanitation in recent years is indicated by the comparative absence of epidemic diseases

among the armies which fought in the World War. Because vaccination has become so nearly universal, the armies of Western Europe, though they came into contact with troops from Asia and Africa, were not attacked by smallpox; and that other terrible enemy of the soldier, typhoid fever, was also held in check through the use of vaccine and enlightened methods of sanitation.

Another striking illustration of what may be accomplished on a large scale by the application of the laws of hygiene is the work of the United States army in the Panama Canal Zone (see PANAMA CANAL). What was formerly a

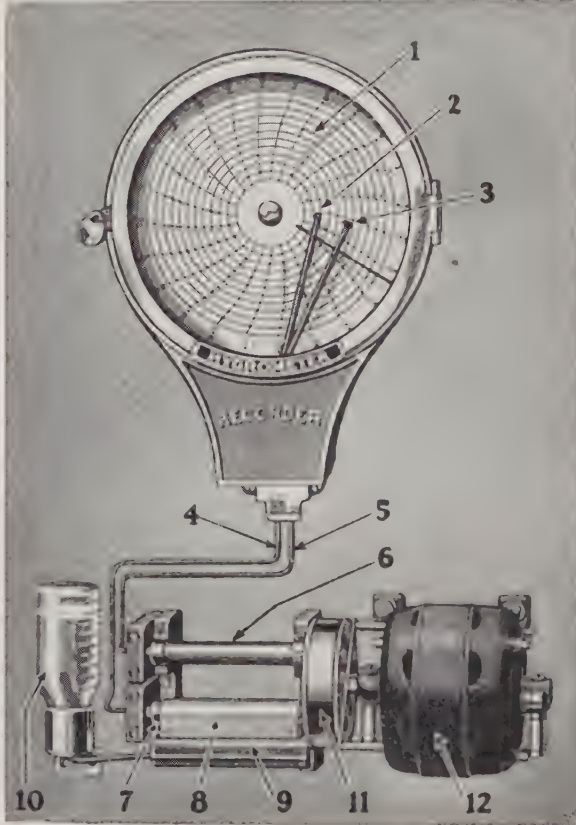
region infested with disease and filth has been made one of the most healthful spots on the globe. Cuba, too, has been made hygienically safe by means of sanitary measures and the extermination of those dangerous carriers of germs—the fly and the mosquito.

Derivation of the Term. *Hygiene* is derived from French and Greek words meaning *healthful*.

Related Subjects.

This important subject is given full treatment in these volumes. The reader is referred to the following articles:

- Antitoxin
- Athletics
- Baby
- Baths and Bathing
- Board of Health
- Breath and Breathing
- Child
- Cookery
- Dentistry
- Diet
- Digestion
- Disease
- Disinfectant
- Education
- Fatigue
- Fly
- Food
- Fumigation
- Garbage
- Gymnastics
- Health
- Health Habits
- Heating and Ventilation
- Home Economics
- Immunity
- Life Extension
- Mastication
- Medicine and Drugs
- Mental Handicaps
- Mosquito
- Nutrition
- Physical Culture
- Quarantine
- Sanitary Science
- Sewer and Sewerage
- Teeth
- Vaccination
- Vitamins



RECORDING HYGROMETER

(1) Chart. (2) Pen arm for wet bulb. (3) Pen arm for dry bulb. (4) Tube leading from wet bulb. (5) Tube leading from dry bulb. (6) Dry bulb. (7) Wet bulb. (8) Cloth wick covering wet bulb. (9) Reservoir. (10) Water bottle. (11) Fan. (12) Motor.

HYGIENE OF EDUCATION.
See EDUCATION.

HYGROMETER, *hi grom' e tur*,
an instrument for

determining the amount of moisture in the air, or, as it is expressed in the reports of the Weather Bureau (which see), the *humidity* of the atmosphere. Numerous experiences tell us that there is more moisture in the air at one time than at another. Clothes hung out to dry will dry very slowly just before or just after a rain, but they dry rapidly on a bright, warm day. Cool days are usually damp and bring clouds and fogs, while warm days are more likely to be clear and dry. This is because the atmosphere can contain more water vapor at a high than at a low temperature. When it has all that it can contain at a given temperature, it

is said to be *saturated*, and the difference between the amount of moisture that the atmosphere contains at a given temperature and the amount necessary to saturate it is the *relative humidity*. The hygrometer enables us to determine the relative humidity, and is of great

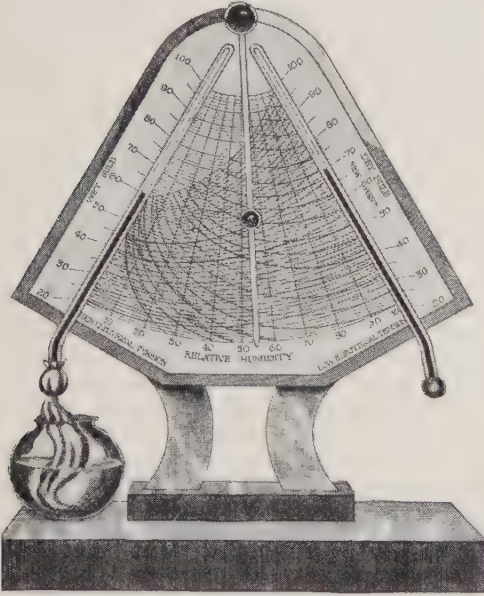


FIG. 1

The "direct-reading" type of hygrometer. Its technical name is hygrodeik. An index with adjustable pointer is designed to swing across the scales, and to take a reading, it is necessary only to adjust the index to the same degree mark on the scale as is registered on the "wet" thermometer. Lines run from the "dry" thermometer downward toward the "wet" one. Swinging the index across the face of the chart until it meets the line coming from the degree mark of the "dry" thermometer, the relative humidity is then noted at the end of the index on the scale, marked, "Relative Humidity," which is the amount of moisture in the air expressed in percentage. There are lines which are etched from the top of the scale downwards to the right. If at the point of intersection of the index, the line is continued to the top, "absolute humidity" will be noted. This is the moisture expressed in weight—viz., grains per cubic foot of air—instead of in percentages. The bottom extremity of the line will give the "dew point," this being the temperature at which moisture will form in visible drops.

value in regulating heating and ventilation, especially in industries where humidity is a factor.

The hygrometer used by practically all government weather bureaus, and also the one most frequently seen, consists of two thermometers attached to the same support. It is known as the *psychrometer*. One thermometer (the dry) indicates the temperature of the atmosphere; the other (the wet) has its bulb covered with muslin or candlewick-*ing*, which is kept moist. The evaporation

of the water in the muslin reduces the temperature of the wet bulb until moisture collects on the tube of this thermometer. The temperature at which moisture begins to collect is the *dew point*, or point of saturation of the atmosphere. By reference to tables which have been carefully worked out, the observer is able to determine at once the degree of humidity.

For the best results, the hygrometer should be mounted so that it can be rotated rapidly, or a strong current of air should be forced against it by an electric fan. Fig. 1 shows a self-reading hygrometer constructed on the same principle. By use of the indicator, the humidity is easily determined. See HUMIDITY.

HYKSOS, *hik' sose*, a line of kings who ruled for an uncertain period of time in Egypt, beginning about 1700 B.C. They originated in wandering tribes which came in with their flocks and took possession of the Nile delta, and for this reason were called the *Shepherd Kings*. They are believed to have been the first to introduce horses and chariots into Egyptian warfare. The Pharaoh of the time of Joseph (which see) is supposed to have been one of the Hyksos.

HYMEN, originally the name of a marriage song among the Greeks, but later applied by them to the god of marriage, whose blessing was invoked at every wedding. He was generally regarded as a son of Apollo and a Muse, but sometimes of Dionysus and Aphrodite.

In Literature and Art. In art, Hymen is represented as a youth of delicate beauty, wearing a crown of flowers and carrying a torch.

Campbell makes use of the name in the lines:

Till Hymen brought his love-delighted hour,
There dwelt no joy in Eden's rosy bower.

HYMENOPTERA, *hi men op' tur ah*, a word meaning *membrane-winged*, is the name of a large order of insects. To this order belong the highly specialized wasps, bees, and ants, as well as certain inconspicuous forms that nevertheless are of interesting life history and habit. Among the latter are the gall flies, whose activities are seen in the gall formations on oak trees and rose bushes. Structurally,

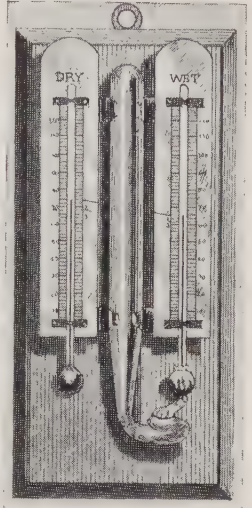


FIG. 2

Mason's hygrometer, the form which is most common.

the Hymenoptera show wide variation, but all possess four membranous wings (except the wingless worker ants and similar special forms). The mouth parts are usually fitted for biting and sucking or lapping, and the species undergo a complete metamorphosis. W.J.S.

Related Subjects. For descriptions of members of the order and supplementary information, the reader is referred to the following articles:

Ant	Hornet
Bee	Ichneumon Fly
Fig	Insect (Classification)
Galls	Wasp

HYMETTUS, MOUNT. See GREECE (Physical Features).

HYMNS, NATIONAL. National hymns are songs accepted by the people of a country as embodying expressions of national sentiment. In many cases, they have been inspired by some great crisis through which a nation has passed. National hymns divide themselves into two classes: the popular tunes or songs which are peculiar to a certain people or which are universal among them; and the hymn or hymns which, by legislative enactment, royal decree, or by precedent, are sung or played on ceremonial occasions or at public gatherings. Sometimes the two are the same. Patriotic songs, or *national anthems*, are closely intertwined with history, and most generally spring up spontaneously in response to some urgent need; seldom are they deliberately thought out and created according to a preconceived plan.

Every country has its song or ballad which serves as inspiration in times of peril. Patriotic feeling always seeks utterance in verse and music; and the powerful influence of the song and ballad in bringing about great changes in national life, whether religious, reformatory, or revolutionary, can be attested to in the history of every country. There are four stages in the history of the development of national music: folk music; national music, involving folk music; music in praise of ruler

or institutions; and patriotic music, the *national hymn*. The following list gives the specified or accepted national hymns of the various important nations:

Belgium; *La Brabançonne*. Words by Jenneval; music by Van Campenhout.

Brazil; *Hymn of the Proclamation of the Republic*. Music by Miguez.

Canada; *Maple Leaf*. Words by Alexander Muir. Czechoslovakia; (translated) *Where is my Homeland?*

Denmark; *King Christian*. Words by Ewald; music by Johan E. Hartmann.

France; *La Marseillaise*. Words and music by Claude Joseph Rouget de Lisle (1792). See MARSEILLAISE, THE.

Germany; *Die Wacht am Rhein*. Words by Max Schneckenburger (1840); music by Karl Wilhelm. See WACHT AM RHEIN.

Great Britain; *God Save the King*, probably by Henry Carey (about 1743). See GOD SAVE THE KING.

Greece; *Sons of Greece, Come, Arise*.

Holland; *Wein Neerlandsch Bloed*. Words by Henrik Tollens; music by J. W. Wilms (1800).

Italy; *Air—Royal March*, by Gabetti.

Japan; (translated) *May the Empire Last*.

Mexico; *Mexicans at the Cry of War*, by Nunó.

Norway; *Song for Norway*. Words by Björnson; music by R. Nordraak.

Poland; (translated) *Poland Shall Never Die*.

Spain; *Himno de Riego*. Music by Herta.

Sweden; *Out of the Swedish Heart*.

United States; *Star-Spangled Banner*. Words by Francis Scott Key; music by John S. Smith; and *Hail Columbia*; words by Joseph Hopkinson (1799). See STAR-SPANGLED BANNER; HAIL COLUMBIA.

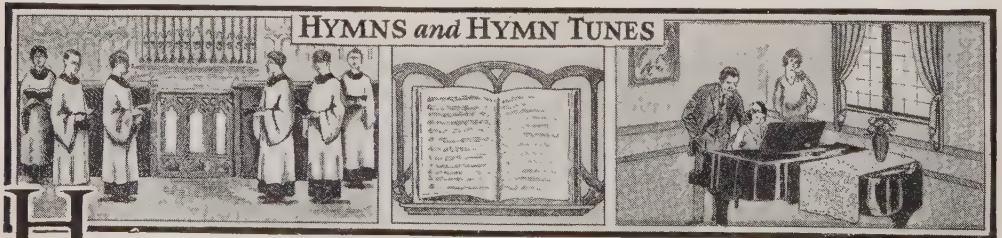
Yugoslavia; a combination of Serbian, Croatian, and Slovene songs.

The following are popular hymns widely used upon patriotic occasions in the various countries named:

United States; *Yankee Doodle*, *Dixie*, *My Country, 'Tis of Thee*, *The Battle Hymn of the Republic*, *Marching Through Georgia*, *Columbia the Gem of the Ocean*.

Germany; *Heil dir im Siegerkranz* (Austria and Prussia); *Deutschland über Alles*.

See HYMNS AND HYMN TUNES.



HYMNS AND HYMN TUNES. The songs which bring peace and comfort, hope and faith to all hearts have been a part of religious services from the earliest days of history. Rhythm and melody naturally react upon the religious sentiment of people and create an influence for good which it is impos-

sible to estimate in words. For the origin and idea of Christian hymnody, we must look to Hebrew sources. The core of the Hebrew religion and worship lay within its religious songs, and it is generally conceded that the Hebrew *Psalter*, taken as a whole, has never been equaled. These songs include the famous

Song of Miriam, the *Nineteenth Psalm*, the *Song of Deborah*, and the *Song of Barak*. Solomon and David are regarded as the great psalmists of Israel. In the New Testament, the hymn note is changed—exalting a Person and not a race. The saintliness of the early Christian ages survives in many Greek and Latin hymns, among them being *Come, Holy Spirit*, which belonged to the early medieval period; *Dies Irae (Day of Wrath)*, by Thomas de Calano (who died in 1226); and *Stabat Mater (The Mother Stood)*, attributed to Jacobus de Benedictis (who died in 1306).

The Protestant Reformation was borne forward on waves of sacred song, and by the introduction of the use of the language of everyday life and popular music for hymns, Martin Luther exerted a permanent influence on hymn-writing, not only upon Germany, but upon all Europe. His own hymns, thirty-seven in number, of which about twelve are translations or adaptations from Latin originals, are among the best-known of the Church. The favorite of these, *A Mighty Fortress is Our God*, is known as the "Battle Hymn of the Reformation."

After the Reformation, the development of hymnody was retarded in England. However, not to be overlooked are the hymns of Milton (written about 1629) and those of Jeremy Taylor (1613-1667). The English Independents, as represented by Isaac Watts (1674-1748), have a just claim to be considered the real founders of modern English hymnology. Watts' hymns, which were very numerous and popular, were written especially to follow sermons, reinforcing the truths brought out. Many of his songs are sung in churches of the present day, especially *O God, Our Help in Ages Past* and *When I Survey the Wondrous Cross*. The Wesleys and the men who gathered about them were prolific hymn-writers, and they produced some of the best hymns in the history of the Church. Charles Wesley (1707-1788) alone wrote over 6,000 hymns, almost 400 of which are still commonly used.

The hymns of more modern days seem to have been inspired by some religious movement or belief, as the Missionary Movement, the Oxford Movement, and the evangelistic movement of Moody and Sankey. Each has produced notable hymns, rarely sectarian and usually appropriate to their purpose. The character of the music of many of the evangelistic hymns is vastly different from that of the earlier hymns; because of their more catchy qualities, their effect upon church music in general possibly has not contributed to deep devotion as surely as did their more serious predecessors.

Among the American hymn-writers of note were John Greenleaf Whittier, Phoebe Cary, Philip Paul Bliss, Julia Ward Howe, Harriet

Beecher Stowe, Ray Palmer, Phillips Brooks, Charles M. Gabriel, and the blind hymn-writer, Fanny Crosby.

The following is a list of some of the most noteworthy hymns in common use in the churches:

Jesus, Lover of My Soul.....	Charles Wesley
Lead, Kindly Light.....	John Henry Newman
Abide With Me.....	Henry Francis Lyte
Rock of Ages.....	Augustus M. Toplady
There Is a Land of Pure Delight.....	Isaac Watts
From Greenland's Icy Mountains.....	Reginald Heber
Nearer, My God, to Thee.....	Sarah Flower Adams
Just As I Am, Without One	
Plea.....	Charlotte Elliott
One Sweetly Solemn Thought.....	Phoebe Cary
Safe in the Arms of Jesus.....	Fanny Crosby
My Faith Looks Up to Thee.....	Ray Palmer
I Love to Steal Awhile Away.....	Phoebe H. Brown
Awake My Soul, Stretch Every	
Nerve.....	Philip Doddridge
A Mighty Fortress is Our God.....	Martin Luther
Sun of My Soul.....	John Keble
Onward, Christian Soldiers.....	Sabine Baring-Gould
Come, Thou Fount of Every Bless-	
ing.....	Robert Robinson
Sunset and Evening Star.....	Alfred Tennyson
How Happy Is the Pilgrim's Lot.....	John Wesley
Stand Up, Stand Up for Jesus.....	George Duffield
Blest Be the Tie that Binds.....	John Fawcett

Ten World-Famous Hymns

Jesus, Lover of My Soul, by Charles Wesley, is one of the noblest songs of modern times embodying Christian faith and hope. It was written in 1740, and several incidents are said to have suggested its composition. According to one version, it was inspired by the plight of a little bird which, pursued by a hawk, took refuge in Wesley's room and hid in his coat. Like the *Rock of Ages*, this song was written in Great Britain, and both found in America the tunes with which they have become intimately associated. To the tune of *Martyn*, by Simeon B. Marsh, the hymn *Jesus, Lover of My Soul* has been borne to every land.

Rock of Ages, by Augustus Montague Toplady (1740-1778). Like the preceding hymn, this is a direct and personal appeal to God. Of it one noted authority has said that "no other hymn has swept the chords of the human heart with a more hallowed touch." It first appeared in an unfinished form in the *Gospel Magazine* of October, 1775; its author, a brilliant young priest, survived its publication only two years, but he lived long enough to give to the religious world one of its greatest songs. It had found appropriate musical setting in the tune *Toplady*, by Dr. Thomas Hastings.

Abide With Me, by Henry Francis Lyte (1793-1847), was inspired in a memorable walk by the sea. Its author, a frail, sensitive minister who lived in Brixham, England, was warned to seek the milder climate of Italy, as he, like Toplady, was a victim of consumption. To live away from the sea and the hardy fisherfolk whom he had grown to love seemed impossible. What he felt and what he suffered, on his last memorable walk beside the waters which he was about to leave forever, no one will know, but in those moments of lonely soul communion, his great hymn had its birth. He died at Nice, France, three months

later. The music for his hymn was composed by Dr. William H. Monk, the musical editor of *Hymns, Ancient and Modern*.

Just As I Am, by Charlotte Elliott (1789-1871), one of the greatest of evangelistic compositions, has possibly touched more lives helpfully than any other hymn, by giving people a sense of their religious needs. It first appeared anonymously in the *Yearly Remembrancer* in 1836. When Miss Elliott was thirty-two, her health failed. While residing at Brighton, England, she became oppressed by the thought of her apparent uselessness as she watched every other member of her family busied in the preparation of a bazaar which was to help raise money for the erection of a college at Brighton. She alone was too weak to lend a hand. For a long while, she sat lost in thought. Then a feeling of peace and contentment came over her, and in this mood she wrote the verses which have endeared her name to posterity.

Nearer, My God, to Thee, by Sarah Flower Adams (1805-1848), was suggested by the story of Jacob's vision at Bethel, as found in *Genesis* xxviii, 10-22. It was first published in 1841, but did not meet with great favor until Dr. Lowell Mason's beautiful music gave it a permanent place in the hearts of devoted people the world over.

Onward, Christian Soldiers, by the Rev. Sabine Baring-Gould (1834-1923), is the greatest of processional hymns, and was originally written for children. A great school festival was to be held in a Yorkshire village on Whitmonday, 1865, and the pupils of the Horbury Bridge School, over which the author was curate, were invited to attend. As the place of celebration was a considerable distance away, the minister composed this stirring hymn to be sung by the children while they were marching from one village to another, on their way to the festival. The spirited music for it was composed by Sir Arthur Sullivan.

From Greenland's Icy Mountains, by Reginald Heber (1783-1826), is a famous missionary hymn. Like the preceding hymn, it was written at a sitting and for temporary need, with no thought of its great usefulness in the future. Heber's father-in-law, Dr. Shipley, the vicar of Wrexham, requested him to write something for his congregation to sing the following morning, Whitsunday, 1819. Heber retired to a distant part of the room, and on the spur of the moment wrote the five verses which have since remained the matchless missionary hymn of Christendom. The melody to which it is sung in America was composed by Dr. Lowell Mason; like the verses, the music was written at a sitting.

My Faith Looks Up to Thee, by Ray Palmer (1808-1887), is another splendid declaration of trust and confidence in God. It was written in 1875, and the author had not the slightest thought of its ever being adopted as a song for worship. Touched by a description, in German, of a suppliant before the Cross, Dr. Palmer put upon paper the thoughts which filled his mind as he sat one afternoon in the quiet of his own room, away from all outward excitement. Dr. Lowell Mason also composed the melody for this hymn.

Stand Up, Stand Up for Jesus, one of America's most popular and soul-stirring hymns, was written by Dr. George Duffield (1818-1888) and repeated at the close of his sermon to give emphasis to the dying words of his friend, the Rev. Dudley Tyng. When he realized that the end was near, and he was asked what he wished to say to his friends and associates, Tyng

whispered his dying message: "Tell them, 'Let us all stand up for Jesus.'" These words were immortalized by Dr. Duffield in his hymn to follow his sermon of eulogy for his young friend.

Lead, Kindly Light, by John Henry Newman (1801-1890), is the author's prayer of a storm-tossed soul for guidance to the light. The poem was written in 1833, while the author was in Southern Europe because of ill health. The spiritual unrest of the day, the result of the Oxford Movement, which in 1845 led Newman to unite with the Roman Catholic Church, had begun to fix its grip on him. It was during this period of anxiety for the future of the Established Church that the noble hymn was written. While on a boat bound for Marseilles, during a great calm that quieted the waters of the Mediterranean, the brilliant young minister, longing for home and weakened by mental and physical suffering, wrote his fervent prayer. The musical setting for it was composed by Dr. John B. Dykes as he walked along the Strand, in London.

Related Subjects. For biographies of the most notable of the hymn-writers listed above, see in these volumes the following titles:

Brooks, Phillips	Taylor, Jeremy
Cary, Phoebe	Tennyson, Alfred
Crosby, Fanny	Toplady, Augustus M.
Heber, Reginald	Stowe, Harriet Beecher
Howe, Julia Ward	Watts, Isaac
Luther, Martin	Wesley
Newman, John Henry	Whittier, John Greenleaf

HYNDMAN PARK. See IDAHO (Physical Features).

HYPATIA, *hi pa' she ah* (about 355-415), a wise and beautiful Greek woman and a philosopher, who appears as the heroine in Charles Kingsley's *Hypatia*. Her father gave her all the training in philosophy which could be obtained in that age, and she was equipped to succeed him as a lecturer at Alexandria. Her fame drew students from all parts of the East. Cyril, the bishop of Alexandria, grew jealous of her power, and one evening some of the lower clergy, whose anger had been kindled against her, seized her as she was returning home in a carriage. They dragged her through the streets of Alexandria to a church called Caesareum, where she was murdered.

HYPERBOLE, *hi pur' bo le*, a figure of rhetoric in which the expression is clearly an exaggeration. In the words of Macaulay, it "lies without deceiving," the speaker or writer aiming to produce a vivid effect by conscious distortion of literal fact. Hyperboles are used commonly in everyday speech, as in such expressions as "Her manner froze us"; "He was in a blind rage." Hyperbole is also common in rhetorical and poetic writing. It is really a kind of metaphor (which see).

HYPERESTHESIA, *hi pur es the' sih ah*, extreme excitability of the sensory nervous system. In certain forms of headache, the slightest stimulus brings on a paroxysm of pain, and when the senses are especially affected, sounds and smells and flashes of light may be experienced, though there may be no

objective stimulus that is apparent. See NERVOUS SYSTEM.

HYPERION, *hi pe' rih on*, in the oldest legends of Greece, was one of the twelve children of Uranus and Gaea, who constituted a race of giants known as the Titans (which see). Uranus, fearing the power of his gigantic offspring, shut them up in the lower regions, but Gaea loosed the bonds of Cronus, the most darling of the twelve. He then set free his brothers and sisters, and to each gave a portion of the world to govern. To Hyperion was assigned the direction of the sun, which he drove across the sky each day in a golden chariot. In later mythology, Hyperion was identified with Apollo, god of the sun, as was Hyperion's son, Helios. See APOLLO; HELIOS.

HYPERTHYROIDISM, *hi pur thi' roid-iz'm*. See METABOLISM.

HYPERTROPHY, *hi pur' tro fie*. See HEART (Disease).

HYPNOTISM, *hip' no tiz'm*. The state of hypnosis is one of partial sleep, with peculiar loss and retention of powers under the influence of an increased suggestibility. This condition comes under the conception of *dissociation*. Such trancelike states (like sleep-walking, religious possession, and possibly the state in which the oracles gave pronouncements) have been known from ancient times. Historically, it is not necessary to go back farther than the practices of healers in curing disease in the seventeenth and eighteenth centuries. Some of these used religious methods (exorcism), while all made a forcible appeal to faith. They may or may not have induced an abnormal state, but clearly made use of the exalted suggestibility of the patients. Two other notions that prevailed were (1) that the cure was due to some cosmic force similar to that employed in magic (which see), and (2) that the power resided in the special gift of the healer.

F. A. Mesmer (1733-1815) revived these notions in his doctrine of "animal magnetism," a theory that he first stated in his medical thesis on *The Influence of the Planets on the Human Body*. He began by using magnetic plates in his treatment, but soon announced that the magnetic fluid flowed from his own person. Mesmer's career was determined by the cures, rather than by the procedures, and by his skill in appealing to the popular imagination. He went to Paris from Vienna in 1778, and soon had an enormous following. He devised the *baquet*, or wooden tub filled with bottles, powdered glass, iron filings, etc., from which projected iron rods which the patients touched. An impressive manner and surroundings, slow music, the passes and strokings, prestige, contagion, the expectation of benefit—all contributed to the effect. In his later stages, he relied entirely upon his personal administrations, and claimed to magnetize a glass of water, or a tree,

which in turn produced the curative effects, all of which were ascribed to animal magnetism.

Mesmer held to the medical theory of crises or turning points in a disease; his procedure was accordingly a means of evoking crises, and thus drawing the symptoms out of the patient. The more violent patients fell into convulsions; some shouted, cried, laughed, and moved about; others perspired, groaned, coughed, had spasms, and then went into stages of languor and exhaustion. As the crises passed off, after a few or many treatments, the patients were dismissed as cured. Both the scenes in the "Hall of Crises" and the nature of the cures, as described by medical men and the patients themselves, strongly suggest the presence of hysterical maladies and the operation of a mental prestige; while equally the dispute over the reality of the cure, the frequent relapses, the more than occasional deaths under his hands, show how often the alleged cures were false, or of but temporary relief or due to self-delusion.

The excitement created by Mesmer's popularity and his personal ambition led to a challenge of the medical profession and the appointment of a commission (one of several) to examine his pretensions. On this commission served such distinguished men as Lavoisier, the chemist, and Benjamin Franklin, then representing the new American republic in Paris. Some of the tests were made in Franklin's garden; it was shown that patients went to the wrong tree and had their convulsions, if they regarded it as the tree which the magnetizer (one of Mesmer's pupils) had magnetized. From such experiments, ingeniously varied, the commission concluded that the actual effect was due to a stimulated imagination, and that there was not a vestige of proof that the alleged fluid or the other fanciful procedures had any existence or significance other than the mental one. The report counteracted Mesmer's growing notoriety, but led to many controversies, medical men taking issue for and against him, while the French Revolution put an end to Mesmer's Parisian career.

Though hypnotism grew out of the interest in animal magnetism, Mesmer had no part in the discovery of hypnosis; his attachment to "animal magnetism" blinded him to the significance of what was actually going on. It was the Marquis de Puysegur—one of Mesmer's pupils—who observed that one of the magnetized subjects could hear only what the magnetizer said, was oblivious to all else, and when awakened had forgotten all that happened while under the influence. He called this condition *artificial somnambulism*. He observed, further, that the subject would execute commands while in this condition, would answer questions, and seemed more intelligent. The condition was no sooner recognized than a false direction was given to the important discovery.

The somnambules were used to prescribe in the trance for their fellow patients; they were credited with a second sight; they were supposed to see directly into the condition of the internal organs, and thus diagnosed, prescribed, and predicted the issue of the treatment. Under such encouragement, somnambules were used for public exhibitions and read sealed messages, saw through sheets of paper, read fine print, suffered needles to enter the skin, etc. With this period of the discovery of hypnosis should be associated the use of this state as an anesthetic; for severe operations were performed upon hypnotized patients (this was before the discovery of ether) in France, England, and India, and thus proved the genuineness of the condition.

The religious, the magnetic, and other magical procedures represent the first stage; while "artificial somnambulism" represents the second stage of hypnotism. The third was inaugurated (in the period 1840-1850) by James Braid, who recognized the trance-state as genuine and abnormal. He at once dismissed the notion of any fluid or physical force, and also the notion that any peculiar power resided in the operator. Everything was referred to the susceptible nervous disposition of the subject under the influence of an exalted suggestibility. It was most unfortunate that Braid added to the bad reputation of "mesmerism" (which interfered with its recognition by the medical profession) by using the hypnotic state—to which Braid gave the present name—to demonstrate the reality of the phrenological functions (see PHRENOLOGY). Thus Mesmer was convinced of the fluid, Puysegur of the second sight of his somnambules, and Braid (for a time) of the reality of the phrenological locations, by the suggestibility of the subjects, who shrewdly enacted the results which the theories of the hypnotizers expected.

The fourth stage in the recognition of hypnotism began about 1870 through the work of Charcot, Liebault, Bernheim, and others in France, and led to the recognition of *suggestion* (which see) as the decisive clue to the phenomena. It was completed by the recognition that suggestibility was but a symptom, and that the dissociated state of the hypnotized patient was the essential factor.

What is altered in hypnosis is the manner of report and control of sensations and movements; what is seen, heard, felt, and done is referred to a restricted type of consciousness dissociated from the normal, complete variety. As the sleepwalker sees enough to guide his footsteps, but is oblivious to the presence of those who may be observing him, so the hypnotized subject responds to the suggestion of the operator, both positively and negatively. If told that a lion has entered the room, he will see the hallucinated lion; or if a chair be

pointed to as a lion, it will become one. If told that the chair has vanished, he no longer sees it. The scene may be dramatically enacted with fear, hiding, shouting, or attack. It was this unlimited possibility of control of actions by the operator that was utilized in the performance of traveling hypnotists; their subjects were put through ridiculous and straining performances; the suggestion of a scene was given, and the performers continued the action according to their experience and capacity. In all this there was little enlightenment beyond proof of the readiness with which the state could be induced in susceptible persons, and the variety of suggestions which could be imposed.

By systematic study, it was found that within the limited field the senses were spontaneously, or could be rendered unusually, acute; faint sounds could be heard, fine print read, discriminations of touch and temperature made beyond ordinary capacity. Motor control was similarly involved. Actions beyond ordinary strength were performed; similarly, by suggestion, paralysis could be induced, partial or complete. Actual sensations were suggested away, and the sense of pain and strain disappeared. Ordinarily, upon a return to the waking condition, there was no recollection of what had taken place. Very striking were the post-hypnotic suggestions; it might be suggested that, after a specified interval after awakening, the subject would fetch an umbrella and open it, or write a card, or ask a question. At the proper time the subject became restless and seemed impelled to perform the prescribed action, though then quite conscious of the impulse which he could not resist.

No brief summary of the variety of hypnotic behavior is possible. The essential fact is the state of dissociation. A part of sensation, movement, and mental action proceeds in isolation from the rest; what is retained and what is lost, what powers are exalted and what reduced, depend upon the nature of the contracted and dissociated field, as it arises from within the subject or is imposed from without by suggestion. What is in abeyance is the normal sway of consciousness and control which would set up a resistance to the imposed suggestion, recognize the unreality of the delusion, and break the spell of the imposed control. Why certain persons should be susceptible to such dissociation is not readily determined; it is a part of nervous liability, as is proved by the established connection between the extreme hypnotic suggestibility and the hysterical condition.

Selecting from the mass of data the more essential facts, we may note, first, the anesthesia, which shows how completely the normal channels of sensation may be blocked, for the most serious operations have been performed in the hypnotic condition; we note the use of

hypnosis to cure hysterical incapacity and such states as insomnia; we note that hypnosis acts as a clue to natural states of dissociation and secures lost power of control by removing mental obstructions; and we note that the dissociation is never complete, which means that there is some sort of intercourse between the functions as exercised and the normal relation. All of these results are valuable in theory and practice. They give an entirely different value to the hypnotic state and require a technical knowledge for their interpretation and their wise application.

Hypnotism is not a toy for amusement, and public exhibitions have been largely condemned. It is an instrument in the hands of psychologists for the analysis of complex mental states, and in the hands of physicians for rectifying nervous disabilities and restoring mental adjustment. It is readily open to abuse, and is only one of several methods to be employed with care and discretion. Its history is interesting, but in no respect more so than in the light which it throws upon suggestibility and the shrewdness with which the hypnotic subject displays the results expected of him.

A few words upon hypnotic susceptibility and the mode of hypnotizing may be added. The state of dissociation is one of degree, and falls into lighter and deeper stages. Statistics are variable, according as they make this distinction; but it is safe to say that ten to twenty per cent of persons may be induced or trained to enter a form of hypnotic trance; while far higher percentages of success are given by French observers. Braid used intense fixation of the eyes at near range (staring at a glass ball), together with a powerful command and a passive acceptance of a sleeplike "going-off." Once the state has been induced, mere expectation, word of command, as "Sleep," or an agreed signal is sufficient to induce the state. Subjects may in part or whole hypnotize themselves; this is called *auto-hypnosis*. They are recalled to consciousness by a sharp command, as "Wake up" or "All right"; the difficulty of awakening is one of the many reasons why the practice in amateur hands is a dangerous one. The susceptibility to the state cannot be regarded as in itself a sign of nervous instability; for vigorous and nervously sturdy persons may succumb. Yet, in general and with reference to the extreme and deeper forms of hypnosis, the relation to nervousness is established.

While at one time great expectations were formed of the curative value of the procedure, and while, unquestionably, it forms an important aid in medical hands to break up stubborn nervous resistance, it is now conceded that hypnosis is but one of several methods of mental therapeutics. Hypnoid states in which the subject remains more nearly awake and renounces

less of his personality are induced by some physicians; the same mechanism of suggestion is the basis of the treatment. In the main, the value of hypnosis lies in restoring functions which have lapsed from normal relations. Its practice should be limited to physicians and psychologists who are conversant with its nature and dangers. The question whether a hypnotized person may be induced to commit a crime is not simply answered; but that answer in the main is affirmative, since moral resistances may be overcome, and the hypnotized victim may be substantially in an irresponsible, because oversuggestible, condition. The law has had to recognize this possibility. J.J.

Related to Various Beliefs. The articles on the following topics treat of related subjects or forms of pseudoscience:

Alchemy	Palmistry
Astrology	Phrenology
Clairvoyance	Physiognomy
Conjuring	Psychical Research
Demonology	Psychoanalysis
Divination	Spiritualism
Faith Cure	Subconscious
Magic	Suggestion
Medium	Superstition
Mesmerism	Telepathy
Mind Reading	Trance
Necromancy	Witchcraft
Occult	

HYPOCOTYL, *hi po kot' il*. See GERMINATION.

HYPODERMIC, *hi po dur' mik*, **INJECTION**, an injection of a solution by means of a surgical needle inserted beneath the skin, the needle being attached to a small syringe. It is commonly used in administering morphine, for the purpose of inducing sleep and relieving pain. The action of the drug used is much more rapid, when introduced in this way, than it is when swallowed, and vomiting is also prevented thereby. See ANESTHETIC.

HYPOTENUSE, *hi pot' e nuse*. See TRIANGLE.

HYPOTHECATION, *hi poth e ka' shun*, a pledge or security given a creditor, through which the debtor retains possession of the thing or things pledged. It is now also applied to the deposit of securities in the form of collaterals, to secure the payment of a loan.

HYPOTHESIS. See SCIENCE AND THE SCIENCES; GEOMETRY (Terms used).

HYSLOP, *his' lop*, JAMES HERVEY (1854-1920), an American leader in the field of psychical research, born in Xenia, O. He was graduated at Wooster (O.) College, studied at Leipzig, Germany, from 1882 to 1884, and took his Ph.D. degree at Johns Hopkins University in 1887. He was instructor of philosophy at Lake Forest University, Ill., Smith College, and Bucknell University, Pa., and in 1891 he became professor of logic and ethics at Columbia University. Dr. Hyslop was the organizer of the American Institute for Scien-

tific Research, and became its secretary. His books cover subjects in logic, ethics, and psychical investigations.

HYSSOP, *his' up*, a bushy evergreen shrub of the mint family, native to Southern Europe. It has been introduced into the warm parts of the United States, and, escaping from gardens, is sometimes seen growing wild along roadsides. The seeds, flowers, and green parts of the plant possess strong scent and taste, and were once used as seasoning and in medicine. Because milder flavors are now preferred, hyssop is no longer used as an herb, but it finds some favor as a shrub for hardy borders. It has a square, coarse stem from one to two feet high, and bears small, stiff, pointed leaves and tiny blue flowers that cluster close to the stalk.

B.M.D.

Scientific Name. Hyssop belongs to the family *Menthaceae*, or *Labiatae*. Its botanical name is

Hyssopus officinalis. It is not the hyssop of Bible reference.

HYSTERIA, *his te' rih ah*, an emotional state which causes a person to undergo various physical, mental, and emotional manifestations. It is more common in women than in men. Violent laughter, sobbing, and screaming may alternate if most of the manifestations are purposeful. Certain convulsive phenomena and apparent unconsciousness are not uncommon.

Hysteria is very apt to be imitative. It results from a lack of training, particularly in self-control, and from a desire for attention and power. It is curable by means of training. Major hysteria is becoming a somewhat rare disorder. This is held to be proof that training is better than it was, and that the race is markedly on the up-grade. See NEURASTHENIA.

W.A.E.

THE WORLD BOOK

MODERN
ENCYCLOPEDIA
COMPREHENSIVE

PICTORIAL

I i

I, the ninth letter in the English alphabet and in all other alphabets derived from the Phoenician. The name in the latter language was *yod*, which meant *hand*, and some scholars have held that in its original form, which was somewhat like a tall, narrow *Z*, the letter was a rude sketch of a hand, bent at wrist and knuckles. Like

7

all other letters in the Phoenician alphabet, *yod* was a consonant, but approached a vowel sound; and the Greeks, when they adopted it, made of it a vowel with the *e* sound. They also straightened it out into its present form. In Latin the letter kept the same sound as in Greek, but the Romans perceived that in certain words, as in the name *Iulius*, it had really the force of a consonant, and later writers adopted a slightly different form for the letter in its consonant use. From this modified *I* came the modern *J*.

The vowel *i* has four main sounds. Long *i*, as it is called, is the sound heard in the word *ice*. It is in reality a diphthong, rather than a single sound, for it is made up of the sound of *a* in *father* and of *i* in *it*. The two are so closely blended, however, that the combination is a difficult one for many foreigners to acquire. Short *i* is heard in *stick*; and the other common sound is that found in *first*. The fourth sound is that which is most common in all languages of the Continent, but very uncommon in English words, except those adopted from foreign languages—the one heard in *machine*. In its consonant value, *i* is found in such words as *genius*.

The Hebrew letter which corresponded to the Phoenician *yod* bore the same name, and as it was the smallest of all the letters, its name came to be used figuratively to denote anything very small. The English word *jot* is derived from it.

IAMBIC, *i am' bik*, **METER**. See **METER**.
IAN MACLAREN, *yahn mah klair' en*. See **WATSON, JOHN**.

IAPETUS, *i ap' e tus*. See **SATURN** (Saturn's Satellites).

IAPETUS (in mythology). See **PROMETHEUS**.
IARBAS, *jahr' bas*, a prince who was responsible for the death of Dido (which see).

IBAÑEZ, *e bah' nyath*, VICENTE BLASCO (1867-1928). Although usually thought of as a novelist, this famous Spanish writer was also a journalist and politician. His views on public questions were so revolutionary and anti-monarchical that he experienced both exile and imprisonment on account of his opinions. He was not generally popular in Spain, but his home city, Valencia, selected him eight times for Parliament. He finally removed to France, living at Paris and Mentone, and becoming the center of a group holding views similar to his own. At the time of his death, it was proposed by the Spanish Directorate that his body be returned to Spain for burial, but he had pro-

vided in his will that this should not be done during the continuance in power of the current authorities. He was buried at Mentone in Spanish earth brought from Valencia by his friends.

His early novels were vivid pictures of provincial life, and in some respects are superior to his later writings, though they did not obtain the popularity of the latter. The story which gave him widest fame was *The Four Horsemen of the Apocalypse*, published in 1918. It was made into a moving picture and in this form became known to millions who had not read the book. The



Photo: U & U

IBAÑEZ

story portrays the horrors and devastation of war, and takes its title from the four riders in the *Book of Revelation*, who received power "over the fourth part of the earth, to kill with the sword, and with hunger, and with death, and with the beasts of the earth." The most terrible scenes depict the disastrous invasion of France by Germany in the World War. The chief characters were Spaniards from Argentina who came to Europe during the chaotic days of the war and became involved in the conflict. The leading part was played by Rudolph Valentino, who was thus brought into favorable notice as an actor.

His Chief Books. Early works were *The Shadow of the Cathedral*, *The Dead Command*, *The Fruit of the Vine*, *Enemies of Women*, *The Mayflower*, *Woman Triumphant*, *The Templess*, and *The Torrent*. Two of the most popular of his works which were later dramatized were *Mare Nostrum* (Our Sea) and *Blood and Sand*.

IBERIA, *i be' rih ah*, the ancient name of the peninsula now comprising Spain and Portugal. The Iberians, probably the most ancient of all European races, inhabited the regions watered by the river Iberus, now called the Ebro. The Basques are direct descendants of the Iberians, whose language they retain in part, and the population of Italy, Spain, and Portugal contains a large admixture of Iberian blood. The race was characterized by long heads and short stature. It spread over large areas of Europe and even as far north as Scotland, the Picts having been identified as of Iberian descent. The term *Iberia* is still frequently used with reference to Spain and Portugal, especially in literature, the expression *Iberian peninsula* being quite common. See SPAIN; PORTUGAL.

IBERVILLE, *e behr veel'*, PIERRE LE MOYNE, SIEUR D' (1661-1706), a French-Canadian soldier, naval commander, explorer, and founder of the province of Louisiana, which became the American state of the same name. In 1698 he sailed with two ships from France to found a colony at the mouth of the Mississippi River, as La Salle had attempted to do, and in 1699 entered Mobile Bay. Leaving his fleet, he set off with a party in small boats in search of the great river. He went up the Mississippi until he came to an Indian village, where the chief gave him a letter which Tonty, thirteen years before, when in search of La Salle, had written and left in the crotch of a tree. Thus he knew that he was on the Mississippi. But, seeing no spot there available for the site of a city, he led his colony to Biloxi Bay and founded Biloxi, thus fulfilling La Salle's dream of founding a French colony on the Gulf of Mexico.

Related Subjects. For supplementary information the reader is referred to the following articles:

La Salle, René R. Louisiana (History) Tonty, Henri de

IBEX, *i' beks*, a wild goat formerly numerous in the high Alpine regions, called *steinbok* by the Germans and *bouquetin* by the French. Long the prey of the huntsmen, the ibex is now seen only in the valleys of the Piedmont, where the few remaining specimens are pro-



Photo: U & U

THE IBEX

tected by the Italian government. This handsome animal is about forty inches high at the shoulder. The horns of the male are magnificent, rising high from the forehead and then curving backward. They are thirty inches or more in length, and have prominent ridges running crosswise along the front. A larger Himalayan species of ibex, still abundant in Central Asia, has horns reaching a length of fifty to sixty inches. They are strong, agile creatures, able to live in the mountain fastnesses as high up as the line of perpetual snow.

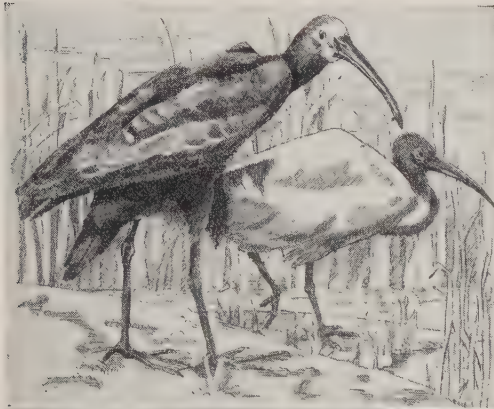
W.N.H.

Scientific Names. Ibexes belong to the family *Bovidae*. The Alpine species is *Capra ibex*; the Himalayan, *C. sibirica*.

IBIS, *i' bis*, a storklike wading bird, closely related to the curlew. It has a long, slender bill with a downward curve, long legs, and a long neck usually almost bare of feathers. The *sacred ibis* of Egypt is about two and one-half feet in length and has black and white plumage. It was worshiped by the ancient Egyptians and embalmed after death. The *scarlet ibis*, a tropical American species, has red plumage, the wing feathers being marked with a black stripe. The *white ibis* is common in the southern portions of the United States, but is seldom seen farther north than South Carolina. The

ibis is a sociable bird and generally lives in colonies, as many as forty pairs sometimes nesting in the same tree.

D.L.



Lower Photo: P & A

THE IBIS

At the left, in the upper illustration, is the white-faced, glossy ibis; at the right, the bird which was the sacred ibis of Egypt. Below, the head and bill of the scarlet ibis of Florida.

Scientific Names. Ibises belong to the family *Ibidae*. The sacred ibis is *Ibis aethiopica*; the scarlet is *Guara rubra*; the white is *G. alba*.

IB'N SAUD. See NEJD; HEJAZ; ARABIA.

IBSEN, HENRIK (1828-1906), a Norwegian dramatist, one of the most famous writers of his century. The titles of his works are household words in all advanced countries, for translations have appeared in many languages. His dramas, partly in prose and partly in verse, embody the spirit of modern times, and it is through his masterful presentation and treat-

ment of many of the social problems of his age that he attained to supreme eminence and authority in the modern drama. He was an apostle of individual freedom, a firm believer in the glory of work, and dreamed of the reorganization of society through the good influence of women.

Ibsen's own life story holds little of interest. He was born in Skein, in South Norway, and was successively director of the theater at Bergen and the Norske Theater at Christiania (now Oslo). In 1864 he left his country, lived for several years in Rome and Dresden, but returned to Norway in 1878. Ibsen's efforts were well directed toward the highest and best in life. In his social dramas, he gave the people of his generation not what they wanted, but what they needed.

Ibsen's Work. *Brand* and *Peer Gynt* are his two best dramatic poems. The former is an arraignment of the half-hearted pietism of many of the Norwegian people; the latter tells the story of the devoted love of an unselfish woman for a faithless, unscrupulous man. *Peer Gynt*, in a dramatized version, met with great favor on the stage, and was one of Richard Mansfield's most popular productions.

Ibsen's first prose drama, *The League of Youth*, criticizes the political parties of Norway and is a travesty on the religious shamming of the day. His *Pillars of Society*, *A Doll's House*, and *Ghosts* were forerunners of the feminist movement which characterized the close of the nineteenth century. In *An Enemy of the People*, Ibsen appears as an aggressive social reformer, and with satire as a weapon, he wages war with a world out of joint. *The Wild Duck* shows the results of awakening ideals in a person incapable of applying them. In *Rosmersholm*, Ibsen turns from an arraignment of society in general to a study of the struggles of the individual toward the light. *Hedda Gabler* is a portrait play of a worthless, idle woman. *The Master Builder* brings a message of encouragement to the great army of workers of the world who earnestly and honestly strive. *Little Eyolf* is a tragedy of a guilty conscience. *John Gabriel Borkman* is the story of a defaulting bank manager. *When We Dead Awaken* reveals the tragedy of the discovery that life's best gifts have been wasted in the pursuit of something false and showy rather than something of enduring reality.

ICARUS, ik' ah rus. See DAEDALUS.

ICE, whether in natural form or artificially produced, has become one of the most useful commodities that civilized man has appropriated for his own needs. In keeping dairy products, fruits, vegetables, and other perishable

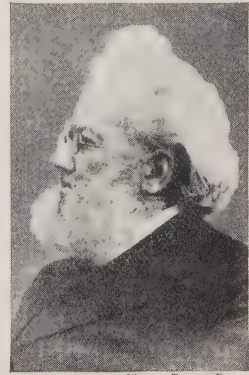


Photo: Brown Bros.

IBSEN



Photos: U & U

The Ice Harvest. Ice is sawed into blocks of the required size and floated to shore, where it is pushed upon endless-chain conveyors and carried into the icehouse. There it is packed in layers with covering of sawdust.

A MODERN ICE MAKING PLANT

CRANE FOR
REMOVING AND
REPLACING CANS

MOTOR FOR DRIVING
BRINE AGITATOR

AMMONIA PIPE
FROM ENGINE
ROOM TO COOLER

BLOWER FOR
SUPPLYING AIR
FOR AGITATION

AIR HEADERS
LEADING TO CANS

MOTOR DRIVING PROPELLER
FORCING BRINE WATER
THROUGH THE COOLER

BRINE
COOLER

CONCRETE
FOUNDATION

A TYPICAL
ICE TANK ROOM
LAYOUT FOR
PLANTS OF 50 TON
CAPACITY OR LESS

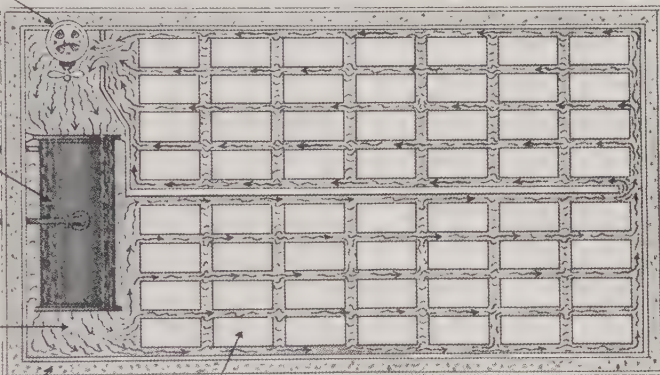
INSULATED
WITH CORK



ICE
TANK
BRINE COOLER

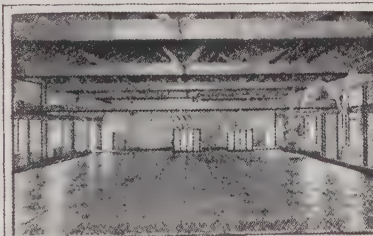
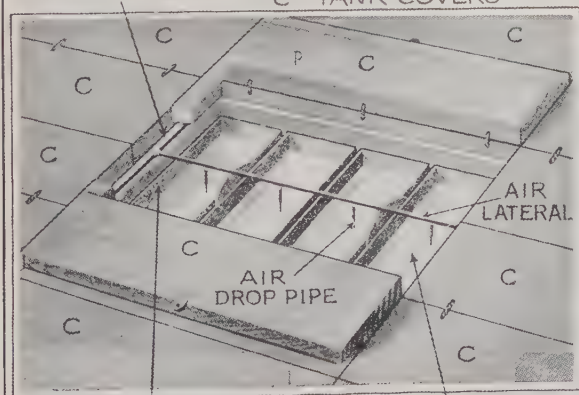
AIR
HEADER
RUNNING
ALONG SIDES
AND CENTER
OF TANK SUPPLYING
AIR TO ICE CANS

FLOW OF
BRINE
WATER



CORK ICE CANS
C—TANK COVERS

PLAN OF FREEZING TANK
SHOWING BRINE WATER
CIRCULATING AROUND CANS
ABSTRACTING HEAT FROM
THE WATER IN THE CANS
CAUSING IT TO FREEZE



INTERIOR OF ICE TANK ROOM

GALVANIZED ICE CANS ICE FREEZING

THE AIR DROP PIPE EXTENDS NEARLY TO THE BOTTOM OF THE CANS THROUGH WHICH THE AIR FROM THE BLOWER IS FORCED INTO THE WATER CAUSING A CONTINUOUS AGITATION OF THE WATER TO REMOVE AIR AND IMPURITIES DURING THE PROCESS OF FREEZING

foods unspoiled in hot weather and in transportation, it has a direct relationship to public health.

Ice is water reduced to solid form through the process of freezing. A block of ice is a collection of minute crystals, but these are not usually discerned, because they are so regularly arranged and so compactly united. If we should subject a piece of ice to the effects of heat, and then examine it with a lens, we would see in the interior numerous tiny six-sided (hexagonal) crystals that under the continued influence of heat would expand into beautiful six-rayed stars. The crystals that are so plainly seen in snowflakes are of the same form.

Under ordinary conditions, pure water freezes at a temperature designated as 32° on the Fahrenheit scale and as 0° on the Centigrade scale, but ice may form at other temperatures than this. The freezing point is lowered when great pressure is applied to the surface of water, and usually the presence of impurities has a similar effect. Sea water, for instance, which contains salt in solution, freezes at a lower temperature than fresh water (about 27° F.). It is an interesting fact that, while nearly all substances are heavier in solid form than in the liquid state, ordinary ice is lighter than water and will float in it. This is due to the fact that as it approaches the freezing point, water begins to expand, and when it freezes, it expands so as to increase its volume about one-eleventh. This expansive force is sufficiently strong to break glass and earthen pitchers, to split open great rocks in the crevices of which water has frozen, and to burst radiators and automobile engines. See GEOLOGY (The Work of Ice).

The Ice Industry. The harvesting, storing, manufacture, and transportation of ice constitute an important industry, which has developed proportionately as ice has come into general use for preserving foods and other perishable substances. This industry is divided into two main branches, one connected with the harvesting and distribution of natural ice, and the other with the production of artificial ice.

Natural Ice, as its name implies, is cut in the winter time from ponds, rivers, and lakes. As a preliminary step in the process of harvesting, the snow and whatever debris may lie on the surface of the ice are cleared off by means of scrapers, and if there is an additional layer of snow ice, this is also removed. The next step is to outline on the ice area the blocks into which it is to be cut. This is done by a machine called a *marker*, which is usually drawn by mules or by horses. This machine first cuts on the surface of the field a series of parallel grooves about three feet apart, and then outlines a second series the same distance apart, which cross the first at right angles. In some instances, the marker is fol-

lowed by a plow whose cutting apparatus consists of a steel bar equipped with a set of sharp knives, one behind the other. The plow cuts the grooves deeper, so they extend nearly through the ice, and it is then an easy matter to pry the cakes loose and float them to shore through channels provided for the purpose. Another machine now in use is a power saw; the cutting apparatus is a rotating wheel with a saw-toothed edge. The cakes are run into the ice houses on elevators or inclined planes; there they are packed in sawdust or other material and kept in storage until needed.

Natural ice is harvested in the United States and Canadian provinces on an enormous scale. The industry in the former country dates from the early part of the nineteenth century, the two most important fields of operation being in Maine and on the Hudson River. There are also huge ice houses on the lakes and streams of Wisconsin, Minnesota, and Michigan, some of which are nearly 300 feet long and five stories high.

Artificial Ice. The trouble and expense attending the transportation of natural ice long distances, and the changeable weather conditions, have resulted in the rapid development of the artificial-ice business in those sections far removed from natural ice fields. The first important ice factory established in America was erected at New Orleans in 1866, and at the present time the people of the Southern states depend almost entirely upon the manufactured article for their supply. Though sections farther north are within reach of natural-ice fields, the fact that artificial ice can be produced at any season has caused it largely to supplant natural ice for commercial purposes.

The manufacture of ice is a practical application of the principle that when a liquid changes to a vapor or gas, heat is drawn from surrounding objects and their temperature is reduced. Ammonia, because of its cheapness and the low temperature at which it is converted into a gas, is the liquid most commonly used as a refrigerating agent in ice factories and cold-storage plants. Ammonia gas is condensed into a liquid by means of a powerful force pump which is driven by steam. Large quantities of heat are generated during the condensation. This heat is usually gotten rid of by allowing the liquid ammonia to flow through a system of pipes outside the factory, the pipes being cooled by allowing water to fall over them. The ammonia liquid, which contains no water and is known as *anhydrous ammonia*, is then sent through a valve into a system of pipes from which the air has been pumped, and which pass back and forth in a large tank containing salt water, or brine. In these pipes the ammonia expands into a gas, the heat required for the process being absorbed from the brine. The latter, though it does not freeze, is cooled until

its temperature is several degrees below the freezing point of fresh water.

The water which is to be frozen is placed in cans the shape and size of the desired blocks of ice, and these are kept submerged in the cold brine until their contents have frozen solid. After the freezing process, the cans are raised from the tank by a hoist and then dipped into warm water to loosen the cakes of ice within them. These operations require from twenty to sixty-six hours, the time varying with the size of the blocks of ice and the temperature of the brine.

A somewhat recent development has been the increasing use of electric refrigeration on farms where electrical power is available, and in city homes and apartment buildings. The electrically operated ice box is cooled to the required temperature for preserving foods and for making its own ice, as described in the article REFRIGERATION.

A.L.F.

Related Subjects. For material of interest in connection with this subject, the reader is referred in these volumes to the following articles:

Ammonia	Iceberg
Cold Storage	Refrigeration
Electricity	Regelation
Expansion	Snow
Freezing	Thermometer

ICE AGE. See GLACIAL EPOCH.

ICEBERG. The deadliest perils that ships have to face, especially in the North Atlantic Ocean, are fogs and icebergs. One of the greatest marine disasters in the history of the world, the sinking of the *Titanic* on the night of April 15, 1912, when 1,517 human beings lost their lives, was caused by collision with an iceberg. The *Titanic* was at that time the largest ship afloat, and was on its first trip from Liverpool to New York.

How They Are Formed. Icebergs are huge masses of ice which break off from glaciers as those slow-moving masses reach the sea. Those in the North Atlantic come from Greenland. That great island is largely covered with a huge sheet of solid ice that attains in places a thickness of 2,000 feet. The numerous glaciers on its margins move slowly toward the sea, where portions become detached through the action of the waves and through their own weight. Most of the icebergs are formed on the west coast of Greenland, but a great number also descend from the east coast. After the icebergs are detached, they drift across Baffin Bay and

Davis Strait to the coast of Labrador. There some of them are caught by the Labrador Current, which flows south, and are carried into the Atlantic Ocean by way of the Newfoundland Banks. When they arrive at about this latter point, they begin to melt, owing to the sunshine and to the action of the warmer water of the ocean. They disappear altogether about 400 miles south of Newfoundland.

Description. Icebergs are of varying size, shape, and contour, and present the strangest and most picturesque forms. Some of them are of gigantic size and weigh millions of tons. They are sometimes miles in length and rise to heights of about 250 to 300 feet above the surface of the sea, but the portion above the water is only about one-eighth to one-tenth of its whole mass. Icebergs consist of clear, compact, solid ice, with a bluish-green tint, and, as explained above, they are formed of fresh water, not of sea water. They reach the routes of trans-Atlantic liners in greatest numbers in April, May, and June, but they are sometimes met earlier and even later. That is the reason why ships crossing the Atlantic follow a more southerly route during these months. Man has no power to destroy an iceberg; it cannot be completely blown up; it cannot be steered away into another course; it cannot even be

approached with safety.

Ice Fields. Icebergs often travel in company and form large ice floes sometimes hundreds of square miles in extent. While some of them show on the surface of the water, others are running almost entirely submerged. Instruments have been devised to reveal the presence of an iceberg; the best of these is the radio-micrometer, a device which is based on radiations of heat and cold.

Icebergs similar to those in the North Atlantic are also found in the south polar regions.

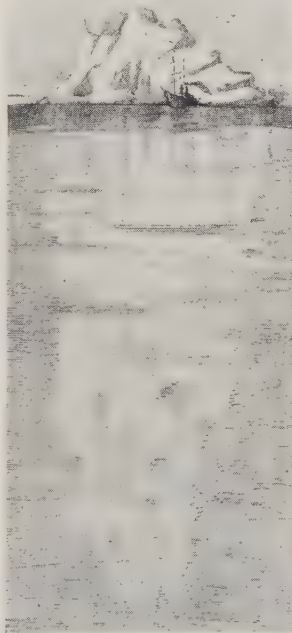
Ice Patrols. The wreck of the *Titanic* led to the establishment of an international patrol along the North Atlantic lanes of ocean travel most endangered by icebergs. Since 1914 the patrol has been maintained through agreement of fourteen principal maritime nations, which contribute to the expense. For the United States, vessels of the Coast Guard (which see) are employed.

R.H.W.

ICEBERG LAKE. See GLA-

CIER NATIONAL PARK.

ICE BOATING. See ICE YACHTING.



AN ICEBERG

Drawn to the average scale



Photo: U. S. N.

Overcoming the Menace of Icebergs. The ice patrol places explosives on the giant masses, sometimes shattering them, but frequently leaving them only slightly damaged, necessitating further attempts. Below, a "white terror of the seas."

ICE BOX. See REFRIGERATION.

ICE CREAM, a food delicacy used chiefly as a dessert, is really a valuable and nourishing item of the diet. It is health in frozen form, important alike for athlete and invalid; and giving it to children is a pleasant way of persuading them to take their daily quota of milk. Its chief ingredients are sweetened and flavored milk or cream. Although ice cream is now considered a peculiarly American dish, it originated in Italy as long ago as 1600, and was known to France and England at an early date. The continental ice cream, however, was more like our mousses, parfaits, and frozen custards.

Dolly Madison introduced ice cream to the United States when she served it at a White House dinner in 1809. From that time on, its favor was established, and the cook who had it made for the mistress of the White House later resigned and set himself up as an ice-cream specialist. America's contribution has been the plain ice cream from flavored milk and cream, and its superiority is attested by the fact that the European product is usually advertised as "American," or "Just like American."

From crude methods of freezing in the home kitchen, ice-cream-making has grown to a great industry, but the principle upon which the process is based is the same, whether a hand freezer or a power-driven apparatus is used. The ice cream freezes because enough heat is withdrawn from it to reduce it to the freezing point. According to the more familiar method, the unfrozen mixture is placed in a metal can, about which an ice-and-salt mixture is packed, the whole being contained in a wooden tub. The salt helps to melt the ice, and is itself dissolved, and in the process, heat is absorbed from the mixture in the can, which becomes a solid. The dissolving of the salt also lowers the temperature of the freezing mixture. That is, a solution of salt in ice water is colder than water resulting simply from melting ice.

The agitation of the ice cream in the can is for the purpose of giving the product a smooth texture. If it were not stirred, it would be rough from bits of ice and solid particles of the ingredients. In commercial practice, cold brine is used in some types of apparatus, instead of salt and ice. The large manufacturers of ice cream use belt-driven or electrically operated freezers.

Ice cream can be made in the electrical refrigerators now coming into general use. The mixture is placed in a freezing tray and stirred gently at half-hour intervals for the first two hours.

The manufacture of ice cream is subject to the regulations of pure-food laws (which see). E.V.M'C.

ICE FIELD. See ARCTIC LANDS AND SEAS (Ice Formation).

ICE-FOOT. See ARCTIC LANDS AND SEAS (Ice Formation).

ICE HOCKEY. See HOCKEY.

ICELAND, one of the most northerly of all inhabited lands, is an island lying immediately south of the Polar regions, its extreme northerly point touching the Arctic Circle. In so northerly a latitude, the land would be a frozen waste were it not for the north-flowing warm currents of the Gulf Stream, which reach the southern coast of the little country, making its climate like that of Southern Canada or Northern United States. Indeed, it is not the cold of Iceland which makes part of it uninhabitable, but the fire of its volcanoes, its fountains of steam, and its earthquakes. That few places are too inhospitable, too barren, and too rigorous for white men to choose as homesites is shown by the fact that Iceland has been inhabited by Europeans and their descendants ever since its discovery, over a thousand years ago. Its population is sparse, however, for, with an area of about 40,000 square miles, slightly less than that of Ohio, it has about 100,000 inhabitants—less than an average of three to the square mile.

Iceland has a length of about 300 miles and a breadth of almost 200 miles; in form it is roughly oval. In the northwest, however, a peninsula, as craggy and as much indented by fiords as the coast of Norway, juts out into the sea.

Remarkable Contrasts. There is no country traveled by man which combines, as Iceland does, the antagonistic marvels of frost and steam, of ice and fire, of darkness and light. Its springs of boiling water, its geysers, its vast volume of milk-white torrents plunging over grim and swarthy rocks, the varied, weird, and fantastic forms of its mountains, the intense green of its meads and lowlands, and often of its climbing slopes, the luminous tints of its peaks, the splendor of its heavens, and the gray, overawing desolation of lava poured out by its volcanoes, are unequaled in all Europe.

The People. The Norwegians settled Iceland, and their descendants, the Icelanders of to-day, have many of the qualities of the Norsemen, being sturdy, thrifty, and intelligent. They have developed sturdiness in combating the none too favorable climate, but this sturdiness alone has not enabled them to keep their death rate down, and until recently, the infant-mortality rate has been distressingly high. But with an improvement in sanitary conditions and an increase in the number of doctors, the population is increasing steadily. Thrift, too, is a natural outgrowth of living conditions in a land where hard work is necessary if life is to be sustained.

The intelligence of the Icelanders is evidenced by the value they place on education, and by

their fondness for reading. Long ago, when countries which are to-day among the foremost in Europe had scarce begun to produce a literature, Iceland had its poets who wrote the epics, or *sagas*, which are still renowned in the literature of the world. The children in Iceland are taught to read and write and figure, and teachers travel about from farm to farm. Schools are increasing, and all of the people are literate. Newspapers abound, as the Icelander is not only an inveterate reader of his own Icelandic literature, and of classic and modern writings of the world, but is vitally interested in the events of the world at large. The Lutheran Church, which almost exclusively represents the religion of the people and is the only religious organization endowed by the state, has a large part in the educational scheme, and many of the teachers are also the preachers. There are fifty savings banks, all prosperous.



LOCATION MAP

The traveler in Iceland sees many odd-looking little iron houses, for wood is scarce, and many islanders send to Birmingham, England, for their "portable" dwellings. From 1912 to 1923, Iceland had complete prohibition of import or manufacture of liquor, except for medicinal or industrial use. In the latter year, however, the law was changed to allow the importation and sale of Spanish wines, in order to prevent the loss of the valuable Spanish market for Iceland's dried fish.

What the People Do. The inhabitants live mostly in the lowlands along the south and southwest coast, where the climate is not so harsh; but even here there is not enough warmth for the raising of many crops, for the average summer temperature of 48° is but sixteen degrees above the average winter temperature. Extremes are not great, for the lowest temperature recorded at the capital is 2° above zero.

The people have two occupations—farming and fishing. Although wheat will not grow, grass is fairly abundant, and the raising of cattle, sheep, and horses is the chief industry. Agriculture has been encouraged by schools, and quick-growing vegetables, such as potatoes and turnips, have proved profitable when grown in sheltered locations. Dairying has been introduced from Denmark and flourishes as a coöperative industry. Some woolen factories are established; with its innumerable waterfalls, Iceland possesses almost inexhaustible

potentialities for water power, which, when utilized, will encourage industry. The cities and many isolated farms make use of water power for electricity, to furnish both light and heat.

There is no lumbering, for the chief trees, the birch and the mountain oak, dwarfed by the climate, do not grow large enough to be of any use. The only mining is done in the deposits of the precious "Iceland spar" (which see), found only in that country. There are rich sulphur and lignite deposits, as yet undeveloped, and iron, copper, and gold have been found in small amounts. There are fish of all kinds, and the hardy Icelandic fisherman puts to sea in his little open boat in all sorts of weather. The man who could write truly the lives of these fisherfolk beside their stormy seas would have tales of daring and of heroism unsurpassed anywhere. The fish are sent, after drying, chiefly to Denmark, Great Britain, and Spain. It is an interesting fact that, with the outbreak of the World War in 1914, Iceland had to seek elsewhere for the supplies obtained in normal times from Scotland and Denmark, and that in October of that year there sailed from the United States the first freight boat that ever went from that country direct to Iceland.

Dairy products, sheepskins, meat, wool, seals, fox skins, and eider down are the chief articles of export. But the imports are restricted, for the life of the Icelander is not a luxurious one; the people live well, but simply. Their most serious handicap is lack of fuel. Some coal is imported, electricity is used, but turf, or peat, remains the chief fuel. The hot springs are also being utilized for heating, and for supplying the immense public laundries.

The Land. Interesting as the people are, the country is no less so. "The land of ice and fire," it has been called, in reference to its ice caps and its volcanoes, its glaciers and its geysers. The whole island has been built up by the outpourings of volcanoes, and the central plateau is still a wilderness of lava beds and deserts, with almost innumerable craters rising above the surface. At least a hundred volcanoes still show signs of life, and, as is usual in volcanic lands, hot springs, bubbling mud lakes, and spouting geysers abound. Not far from Hekla, the most famous of the volcanoes, is the Great Geyser, which once hurled its immense columns of hot water to a height of over 150 feet, but which is now a deep pool of boiling water. From this geyser, all of the geysers of the world have taken their name.

In this land where snow falls the year round, there is found, also, the hottest spring in the world—a spring whose waters below the surface are fifty degrees above the boiling point. And here, there, and everywhere are the ice fields—"dead" glaciers which no longer have a true



THE WATER FRONT OF REYKJAVIK

Photo: U & C

glacier flow. Thus this strange country, in most places so inhospitable to human life, is a land of wild, magnificent scenery. It offers, in addition to its wonders, a summer climate delightfully cool, and days which almost literally have no night. In the wild regions, reindeer abound, together with *fóxes* and a hundred species of birds. One-half of these are aquatic, and they include the eider duck, valued for its down.

Government and History. Formerly a colony of Denmark, Iceland has been recognized as a separate kingdom since 1918. The only political tie which binds Iceland and Denmark together is the fact that Icelanders accept the Danish king as their king. There is a legislative body, known as the *Althing*, of forty-two members, all native Icelanders elected by popular vote. This body acts independently of Denmark in all respects. Women vote on equal terms with men, and there are no property qualifications. The capital and only town of importance is Reykjavik (see below). There are but few real villages.

Discovered in A.D. 870 by the Norwegians, Iceland was speedily settled, for the harsh climate was easier to bear than the severe rule of the Norwegian king, and by A.D. 930 a sort of republic had been established which was not dissolved for about four centuries. In

the year 1000, Christianity was introduced, and from that time, growth in civilization was steady. A really remarkable literature developed in the twelfth and thirteenth centuries, partly as a result of the isolation of the island and its rigorous climate; for during the long winter, the people found their chief delight in listening to stories, and it was those hero-tales which were worked up into the classics of the language.

All this time Iceland had been independent, but in 1262 it became united with Norway, and eighteen years later passed with the latter country under the sway of Denmark. The outstanding events in the centuries that followed centered about natural forces rather than political contacts. Volcanic eruptions were frequent, and were almost always followed by floods from the glaciers which the hot lava had melted. Of all these eruptions, the most disastrous was that of Laki, in 1783, by which one-fifth of the inhabitants were killed. Earthquakes and famine were frequent; cholera and the black death stalked the land, the latter carrying off in two dread years about two-thirds of the population.

Within these troubled years, the Reformation was introduced into Iceland and spread rapidly. England captured the island during the Napoleonic wars, but surrendered it to Denmark in

1815. In 1918, by mutual consent, Iceland became virtually free, as related above. This plan is to continue for forty years; at the end of that period, the island will determine upon its future. In 1925 there was evidence of a plot to disrupt the government and establish Russian communist rule, but it failed. By 1930 the islanders began to work for complete separation from Denmark.

Iceland is making constant and rapid progress, even in population. The fierce loyalty of the people to their home discourages emigration. Communication facilities of all sorts are constantly being developed, such as bridges, telephone and telegraph, radio, and good driving roads in all districts. There are no railways as yet, the country being small and cut by fiords, mountains, and lava beds. Ponies are largely used in overland travel, and a system of steamships connects the various harbor points. Motor cars are used in the cities and towns. A telegraph cable connects with the Shetland Islands.

In 1930 Iceland celebrated the one-thousandth anniversary of the establishment of the Althing, which is the oldest parliamentary body in existence.

Reykjavik, *ray kyah veek'*, the capital, is situated on the southwest coast, at the head of Faxa Fiord. The town has professional, elementary, and secondary schools, an observatory, a theater, a library, and a university. Being the cultural center for the island, the city fosters music and art, and publishes three daily newspapers. The minister to Iceland, appointed by the Danish king, lives in Reykjavik. The Althing, or Parliament, meets there. Most of the year the port is icebound, but in summer a steamship line to Copenhagen operates. The population is about 22,000.

Related Subjects. The reader who is interested in Iceland is referred for related material to the following articles in these volumes:

Edda	Iceland Spar
Fiord	Northmen
Geyser	Sagas
Hekla	Volcano

ICELAND MOSS, a species of lichen that grows in abundance in Iceland and on the



TWO VARIETIES OF ICELAND MOSS

mountains of many northern countries, such as Scotland and Norway. It grows to a height of

about one and one-half to four inches, and on account of its erect growth, has the appearance of a moss. The plant is used in Iceland as a food, being either dried and beaten into a powder, from which bread is made, or boiled with water and milk until it is transformed into a jelly. Iceland moss is used in industry for dressing the warp in weaving, and also in the manufacture of paper. See LICHENS.

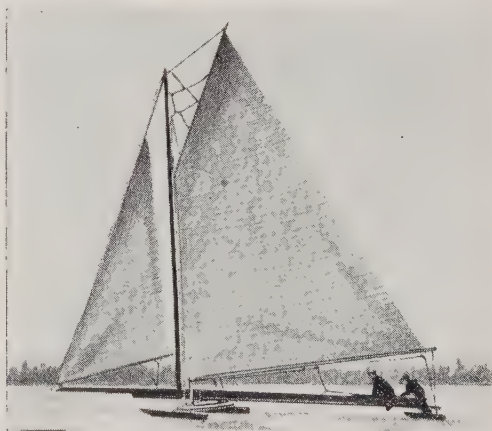
Scientific Name. Iceland moss belongs to the family *Parmeliaceae*. Its botanical name is *Cetraria islandica*.

ICELAND SPAR, a transparent mineral through which objects appear to be duplicated. Iceland spar is a colorless variety of calcite (which see), and forms in perfect transparent crystals, which may be in the shape of a rhombus. It takes its name from the fact that it is found in Iceland. When one of the crystals of Iceland spar is placed over a dot or a line, two dots or two lines are seen, the peculiarity being due to double refraction of light (see POLARIZATION OF LIGHT, for illustration of this phenomenon). Iceland spar is unsurpassed as a material for optical instruments, but has become rare and costly.

A.N.W.

ICE PACK. See ARCTIC LANDS AND SEAS (Ice Formation).

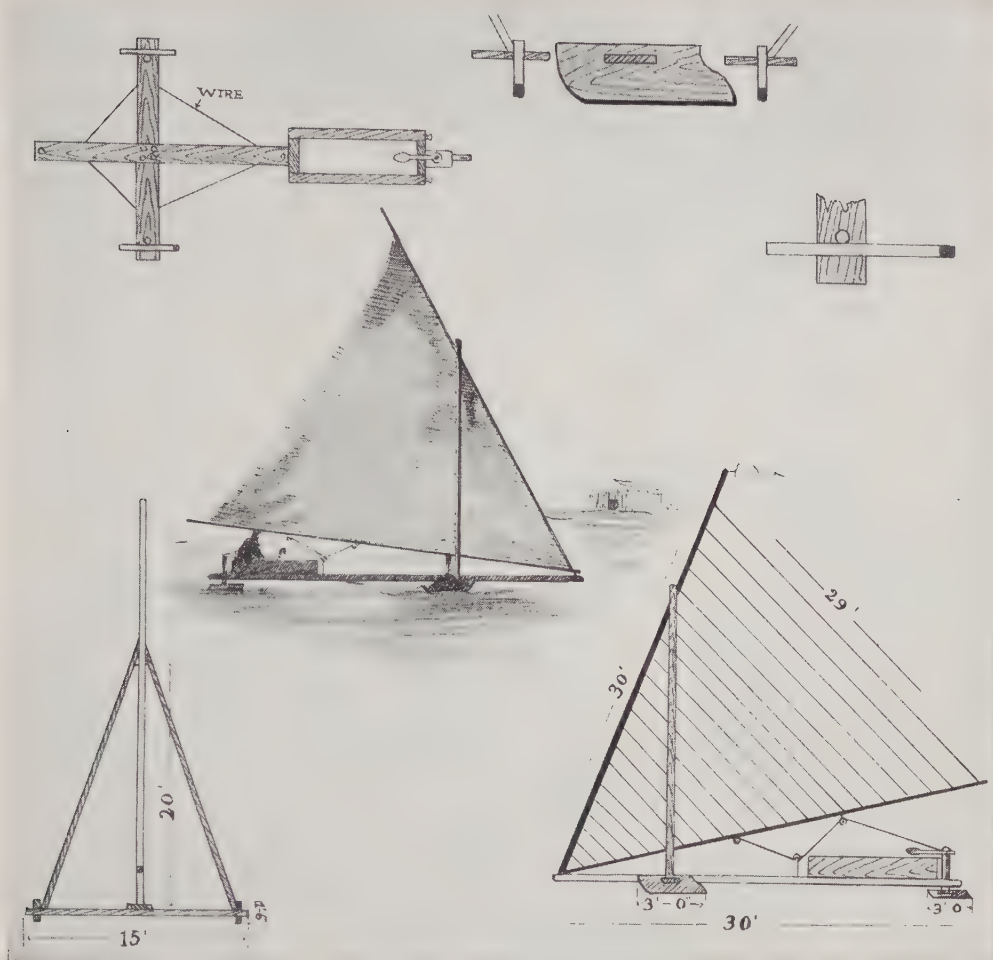
ICE YACHTING, *yot' ing*, sailing over the ice in a specially constructed boat on ice runners, is a sport of distinctly American origin,



AN ICE YACHT

A single-masted vessel such as is pictured here can exceed the speed of a fast express train.

and still largely confined to the United States and Canada. Russia has in a slight measure adopted it, but in no other country has it ever reached the position of a regular winter pastime. As early as 1790, ice-yachting contests were held on the Hudson River at Poughkeepsie, N. Y. The original ice yacht consisted merely of a square box with an ordinary skate on each side, and one at the back to serve as a



HOW TO BUILD A SMALL ICE YACHT

Details of construction are shown with sufficient clearness to enable any skilful boy to construct a serviceable yacht. When completed, it should have the appearance of the boat in the middle picture.

rudder. The modern speedy ice yacht consists of a long beam, or body, with a crossbar, and with a spread of sail capable of producing a speed of seventy miles an hour and more. At each end of the crossbar a skate, or runner, is fastened, and another is used as a rudder, being attached to the lengthwise bar, or body, of the craft. The box for the passengers may be elliptical or triangular, and of whatever size is convenient. The mast is usually placed at the junction of the crossbar and the body of the yacht, or a little in front of the crossbar. A second mast is often added at the stern. Masts and spars are generally made hollow, and the rigging of pliable steel wire.

Ice-yacht races are important winter events. The course is always triangular, usually with a distance of one mile for each side of the

triangle. Contestants must sail a given number of times round the course in each heat.

ICHNEUMON, *ik nu' mon*, the name applied to a number of small, weasel-shaped, flesh-eating animals of the civet family. The name, which is from the Greek, when translated liberally means *to track or hunt out*, referring originally to the ichneumon's habit of seeking the eggs of crocodiles. The best-known species is found in Egypt, where foreign residents call it *Pharaoh's rat*. It is covered with long, wiry fur of a grayish-yellow color, and has black feet, tail, and muzzle. It feeds on rats and mice, birds and reptiles, and is partial to poultry and their eggs. It was highly esteemed by the Egyptians because it kept down the number of

crocodiles. During the overflow of the Nile the ichneumon sometimes enters the homes of man, but it usually limits its wanderings to the



THE ICHNEUMON

fields and river banks. The Indian ichneumon, or *mongoose*, is smaller than the African species and has pale gray fur. It performs invaluable service in its native land as a serpent-killer, attacking and destroying reptiles of all sizes with the greatest ferocity. See MONGOOSE.

M.J.H.

Scientific Names. Ichneumons belong to the family *Viverridae*. The Egyptian species is *Herpestes ichneumon*; the mongoose, *H. griseus*.

ICHNEUMON FLY, any one of numerous parasitic insects belonging to the same order as bees and wasps, the *Hymenoptera*. They are not true flies (which are two-winged insects), but possess four membranous wings. There are thousands of species, grouped into several families. Ichneumon flies are of importance to agriculture because they feed on numerous plant-destroying insects, in all stages from eggs to adult. Caterpillars and plant lice



ICHNEUMON FLY

(a) the adult fly. (b, c) Back and side view of larva. (d) Head of larva.

especially are victims of these parasites. In size they vary greatly, some being almost too minute to be seen, and others attaining a length measured in inches.

The most interesting species, perhaps, is the *Thalessa*, which attains a maximum length of body of two and one-half inches. In the female, the body terminates in a pointed drill, or *ovipositor*, six inches long. This process consists of three threadlike parts that the insect can draw together to form a tube for

the passage of her eggs, after she has bored a hole into the trunk of a tree. In drilling this hole, she throws the ovipositor over her back in a loop and uses her body as a derrick. The drilling proceeds until the ichneumon fly reaches the burrow of a particular wood-boring insect. Here an egg is deposited. When hatched, the larva creeps through the burrow until it reaches its victim, and after killing the latter by sucking its blood, remains in the tree until it becomes an adult. Occasionally, the invader pushes her ovipositor into the wood so tightly that she cannot withdraw it, and is held there a captive, to die of starvation. W.J.S.

Derivation. The name ichneumon is derived from that of an Egyptian animal (see preceding article), and means to *track*.

ICHTHYOSAURUS, *ik the o sawr' us*, a word derived from two Greek words meaning *fish* and *lizard*, and now applied by scientists to



SUPPOSED FORM OF THE ICHTHYOSAURUS

the fossil remains of certain marine reptiles. They had round tapering bodies, large heads, long, powerful tails, and crude feet resembling paddles. It is evident from remains found in England and Europe that they once existed in vast numbers. In size they varied greatly; some were over forty feet in length, while fossilized specimens only four feet long have been found. Their food consisted of fish. About thirty-five different species have been discovered as fossils in widely distributed parts of the globe. They were apparently most numerous on the south coast of England and parts of the coast of Germany, but remains have been found in South America, Australia, New Zealand, and also the East Indies. See FOSSIL; DINOSAURIA.

W.N.H.

ICON, *i' kon*, a variant of *eikon*. See EIKONS; ICONOCLASTS.

ICONOCLASTS, *i kon' o klasts*, a name applied to the image-breakers in the days of the early Christian Church. There had long been a dispute dividing the Church, concerning the images of Christ and the saints which were placed in all churches. In the eighth century the dispute came to a climax. In 726 Leo III issued an edict condemning the worship of images and the burning of incense in their

honor. Many images were destroyed, and the Church was divided into factions. The Iconoclasts, as those objecting to the presence of images in churches were called, persecuted the image-worshippers, who retaliated whenever possible.

A council held in Constantinople in 764 condemned image worship. The second Council of Nicaea defined a doctrine, asserting that the images were not worshiped, but were venerated for what they represented. The controversy lasted for a century. In 842 a council at Constantinople declared in favor of image worship. In the Roman Catholic Church, images are still retained and venerated as symbols. In the Greek Orthodox, veneration of pictures is allowed, but the

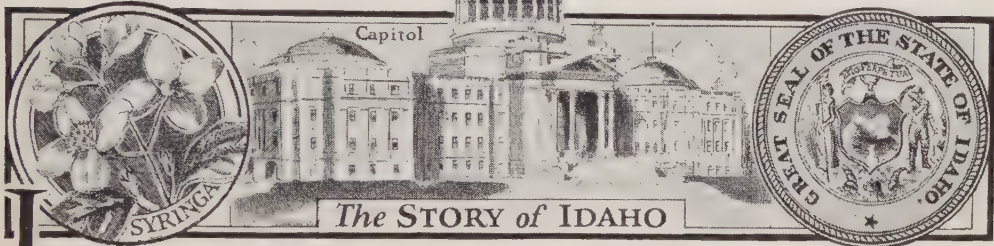
only graven image whose adoration is permitted is the figure of Christ. In Russia, before Soviet rule was inaugurated, sacred figures called *eikons* were placed in all churches and taken with the armies into battle, but they were not actually worshiped.

Derivation. The word *iconoclast* was derived from the Greek *eikon*, meaning *image*, and *klan*, which means to *break*. It has a modern application, being applied to any persons who attack long-cherished beliefs.

ICTERUS, *ik' tur us*, another name for jaundice (which see).

IDA, MOUNT. See **TROY**.

ICTINUS, *ik ti' nus*, one of the designers of the marvelous Parthenon at Athens. See **PARTHENON**.



IDAHO, *i' da ho*, is the northernmost of the Rocky Mountain states. On clear mornings the snow-clad crests of the high summits reflect the level rays of the sun as it rises above some far-distant horizon, and for a brief moment, while the valleys are still concealed by the last gray shadows of night, the sunlight appears to move swiftly down the slopes of the mountains. Old Indian traders say that, during that brief moment, the Shoshone Indians look toward the mountain tops and exclaim, "Ee-dah-how! Behold! The sun comes down the mountain." The popular name of the state is **GEM OF THE MOUNTAINS**; the state flower is the syringa.

Perhaps something of the old frontier atmosphere lingers in Idaho. It is still a great mining state, as in the days of its settlement. The great flocks of sheep and herds of cattle upon the ranges also recall the early days. Lumbering, stock-raising, and mining, pioneer industries, are still the principal industries. With irrigation, agriculture has come to the fore. Manufacturing, for which the great rivers and springs give ample reserves of power, links in with lumbering and agriculture; these three, together with mining, give Idaho a splendid basis for steady growth.

Size and Location. In size Idaho ranks twelfth among the states of the Union. It has an area of 83,888 square miles, which makes it about twice the size of Ohio, and about one-quarter the size of British Columbia, its

neighbor across the Canadian border. Idaho is irregular in shape, and appears on the map in the form of a huge easy chair fronting the east, and with the top to the north. Washington and Oregon form the back of the chair, Nevada and Utah the base; Wyoming completes the seat, in which Montana seems to recline. The narrow northern portion is also called the Panhandle district because of its shape. It is less than fifty miles wide at its northern boundary, but it extends 320 miles on the southern boundary, while its length along the western line is 485 miles.

Its People. Idaho is a young state still in its growing stages, as is shown by the 1920 census report of 431,866 inhabitants, an increase of nearly one-third over the census of 1910. Between 1910 and 1900, this was one of three states reporting over 100 per cent increase. The average number of persons to the square mile was 5.2 in 1920, as compared with a density of 35.5 per square mile for the whole of the United States. Of the total population of Idaho, 38,963, or 9.0 per cent, were foreign-born whites; 3,098 were Indians, 2,154 were Asiatics, and 920, or 0.2 per cent, were negroes. Of the native white population, 92,453, or 21.0 per cent, were of foreign or mixed parentage. Swedish, Canadian, English, and German people form the greatest proportion of the foreign population.

Nearly three-quarters of the total population live in rural communities, and only twenty-

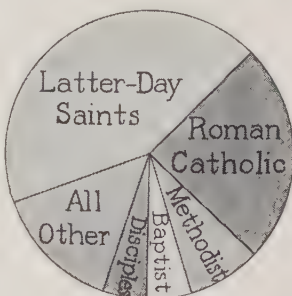


ADMINISTRATION BUILDING OF THE UNIVERSITY OF IDAHO

This state school is known throughout the world for its courses in forestry.

seven per cent in cities of 2,500 inhabitants or over. The capital city is Boise.

Religion. The strongest Church here, just as in the neighboring state of Utah, is that of the Latter-Day Saints (or Mormons), who comprise about thirty per cent of the church members. Next in numbers come the Roman Catholics, with about twenty per cent, while of the Protestant sects, the Methodists are most numerous.



RELIGIONS IN IDAHO

Education. From an educational point of view, the state occupies a leading position among the states of the Union, as shown by the statistics of illiteracy. Thus, in 1920 only a small proportion of the population, 1.5 per cent, was unable to read and write. Idaho possesses a well-developed modern educational system, and has a larger number of schools per capita than any other state in the Union. The teaching requirements are high. There are a number of private and parochial schools in the state with standards equal to those of the public schools.

The state board of education consists of six members, five of whom are appointed by the governor to serve a period of five years. The sixth member is the state superintendent of public instruction. This board has general supervision of all state educational institutions and public schools, and constitutes the board of regents of the University of Idaho. The higher educational institutions are:

University of Idaho, located at Moscow, founded in 1889, and opened for instruction in 1892. It maintains a college of letters and science, and colleges of engineering, agriculture, law, mines, forestry, and education. Agricultural experiment stations and movable schools of agriculture—the latter in connection with an agricultural extension-service division—are also conducted by the institution.

University of Idaho, Southern Branch, located at Pocatello. By act of the legislature of 1927, the Idaho Technical Institute was made the Southern Branch of the University of Idaho. This is a junior college, and carries the work of the first two years of the university.

College of Idaho, at Caldwell, was founded in 1891. It is a Presbyterian school, but is open to students of all denominations.

Gooding College, at Gooding, is maintained by the Methodists. It was founded in 1917, and is coeducational.

Ricks College, at Rexburg, is a Latter-Day Saint school, offering a two-year college course.

Charitable and Penal Institutions. The state maintains a sanitarium and training



Photo: U & U

CASTLE AVENUE, IN THE CITY OF ROCKS

A weird section in Gooding County, withdrawn from settlement in order to add it to the national parks area.

school for feeble-minded and epileptics near Nampa, called Crescent Hill Retreat. Sanitariums and asylums for the insane are located at Blackfoot and Orofino. The state penitentiary is at Boise, the capital; a soldiers' home is also maintained in the same city.

Physical Features. Idaho is a mountainous state, its mean elevation being about 4,500 feet above sea level. Lewiston, on the western border, is the lowest point in the state, at an altitude of less than 750 feet above sea level, while Hyndman Peak, in the Sawtooth Range, is the highest, reaching an altitude of 12,078 feet. The Salmon River Mountains and their offshoots divide the state into Northern and Southern Idaho. Throughout the state, mountains and highlands are interspersed with deep, fertile valleys and level plains.

A feature of the southeastern section of Idaho is the vast arid plain of the Snake River basin, extending for a distance of 350 miles in length, fifty to seventy miles in breadth, and having an area of 30,000 square miles. The characteristic vegetation of these plains is a thick growth of sagebrush, and that, coupled with the great scarcity of water, has given them the appearance of a desert (see *Agriculture*, below). Well-known landmarks of this region are the three isolated hills, commonly known as *buttes*, which rise suddenly above the plain, namely, the Big Butte, 2,350 feet high; East Butte, 700 feet high; and Middle Butte, 300 feet high.

In the southern section of the state is a great lava bed, 400 miles long and over forty

miles wide. This newly discovered volcanic field, with sixty-three extinct craters and brilliantly colored frozen lava flows, was set aside May 2, 1924, as a National Monument, "Craters of the Moon."

Rivers. Many of the rivers flow through deep canyons which are remarkable for the beauty and grandeur of their scenery. The Snake River, the chief river of the state, flows for a distance of nearly 600 miles through a deep canyon, whose walls vary from a few hundred to thousands of feet in height. In fact, some of the most magnificent sights in the West are to be found here. Such are the Shoshone Falls, where the river, 950 feet in width, makes a sudden plunge of 212 feet, greater than that of Niagara. Above these falls, extending a few miles back, are several smaller falls and cataracts. Below the falls, in the Canyon of the Snake, are the Thousand Springs, a forty-mile stretch of snowy cataracts springing from the black lava walls. Other falls of the Snake River worthy of mention are the American Falls, the Twin Falls, and the Idaho Falls. On the Salmon River, the other principal river in the state, occur the Salmon Falls. The Salmon River is navigable for 400 miles in flatboats; it flows through one of the longest canyons in the world. In its rivers and falls, which can be utilized for the production of power, Idaho possesses one of its chief natural resources. A number of modern plants for the production of power on a large scale have already been erected, and numerous others are projected.

Since 1915, when the Celilo Canal on the Columbia River was opened, vessels of the river, stern-wheel type have been able to navigate from the Pacific by way of the Columbia and the Snake up to Lewiston, a distance of about 480 miles, thus belying the map by giving Idaho a Pacific port.

Climate. Considering its mountainous character and its northern situation, Idaho enjoys a climate that is mild, free from extremes, and remarkably healthful. These mild conditions are due, first, to its nearness to the Pacific Ocean, and second, to the protection afforded by the great Continental Divide. In the mountain districts the winters are severe, with heavy falls of snow, reaching seven to ten feet deep. But even here, some of the valleys are so sheltered that herds of cattle are able to roam at large throughout the year. The heavy snow falls feed the numerous streams, and their water is stored for irrigation purposes, for the southern and central portions of the state receive little rain during the summer. The mean annual temperature through the whole state is 45.5° F.; the average highest summer temperature is 100.8° F.; while the average lowest temperature in the winter reaches 21.5° F.

Agriculture. In spite of great natural disadvantages, agriculture has made great strides during the last few years in Idaho. Except in the broad, fertile valleys of the famous Panhandle district, situated in the northern part of the state, the soil is generally arid. The region most suitable for agriculture lies in the southern and central portions, in the level plains found along the Snake River basin and its tributaries, where the soil, of volcanic origin, has high fertility. It is here that extensive irrigation works have been constructed, which have transformed a forbidding desert into smiling gardens and fertile wheat fields. Dry farming is practiced extensively in the higher districts of Southern Idaho (see DRY FARMING).

Over 8,000,000 acres of the total land area is occupied by farms. Until 1918 by far the most important crop, both as regards acreage under cultivation and value of products, was hay and forage plants of all sorts, of which clover and alfalfa were the most valuable. Since the year named, wheat has become the state's leading crop, and a large proportion of it is winter wheat raised by dry-farming methods, especially in the eastern parts, where the greatest fall of rain occurs in the spring. Potatoes are in most years second to wheat in importance. In the broad and sheltered valleys, nestling among the mountains, apples, plums and prunes, peaches, and cherries are grown. At Mesa is the largest individually owned orchard in the world; from its packing plant the fruit is conveyed to the railroad, thirty-six miles away, by aerial tramway.

Stock-Raising. The raising of livestock constitutes one of the principal occupations of the people, for in this state we still find great areas, estimated at over 20,000,000 acres, utilized for grazing purposes. It is a common thing to find in Idaho large ranches, a few of them several thousand acres in extent. Numerous herds of cattle roam over the plains of Southern Idaho and in the sheltered valleys in the north. The raising of cattle is, however, surpassed in importance by the raising of sheep. Idaho, with over 2,400,000 sheep, ranks among the first eight states in the production of wool. Boise is one of the most important inland wool markets in the United States. The sheep graze in the mountains during the summer, and are brought down into the valleys and the plains in winter.

Irrigation Works. With nearly 3,000,000 acres of irrigated lands, Idaho occupies fourth rank among the states of the Union as regards its acreage under irrigation. Some of the greatest irrigation works in the world are situated here. Especially worthy of mention is the Arrowrock Dam, a storage dam built across the Boise River. The structure is 349 feet high, and has a crest length of 1,060 feet, with a reservoir capacity sufficient to cover 245,000 acres with water to the depth of one foot. This is the highest masonry dam in the world, and the concrete in its building amounted to 530,000 cubic yards. The American Falls Dam and Reservoir in the Snake River, completed in 1927, is one of the great projects of the West, and stores water sufficient to cover 1,700,000 acres with a foot of water. The dam is 5,227 feet long and eighty-three feet high.

Other great works are the dam across the Snake River at Minidoka, diverting water for irrigating 119,000 acres, and the great dam at Milner, also across the Snake River. About 6,000,000 acres will be under irrigation when all the projects are completed.

Forests. In Idaho are to be found some of the largest white-pine forests in the world. The forests constitute one of the richest natural resources of the state, covering nearly forty per cent of its surface. It is estimated that the total stand amounts to about 129 billion feet, board measure. About 20,000,000 acres of timbered land have been enclosed in the national forest reserves. The forests contain evergreen and stately white pine, gigantic red or Douglas fir, yellow pine, spruce, birch, willow, and hemlock. Great numbers of logs are floated down the Clearwater River to Lewiston, which has become an important lumber market; here has been completed the largest single-unit sawmill in the world.

Minerals. Mining, naturally, is one of the leading industries, and the mineral resources of the state are both varied and extensive.

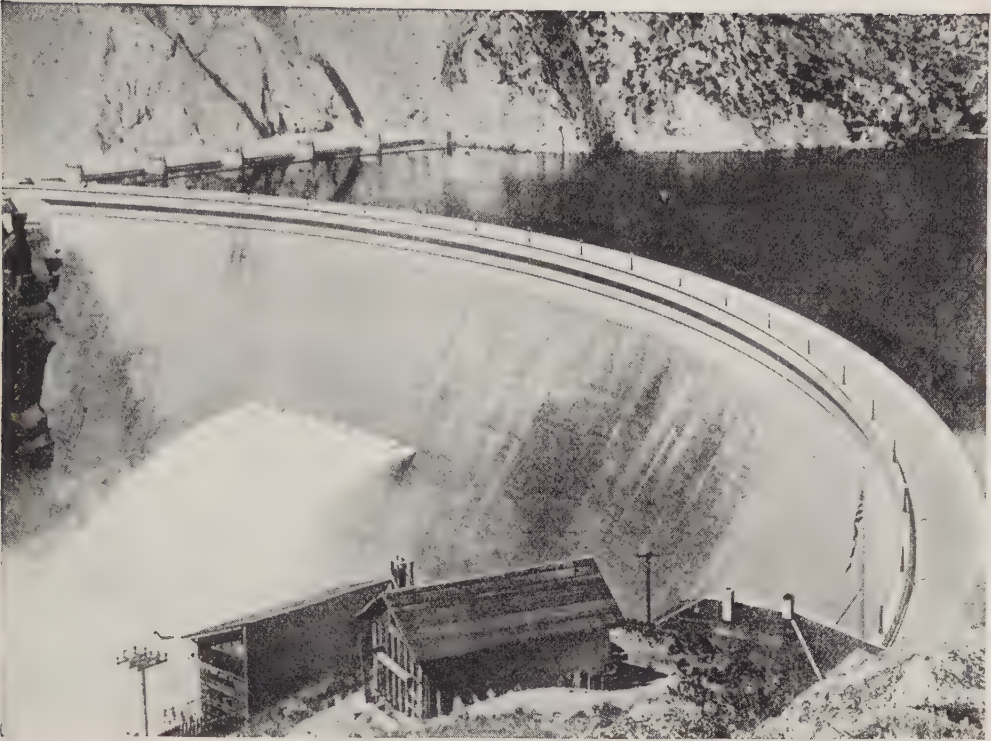


Photo: U & U

ARROWROCK DAM

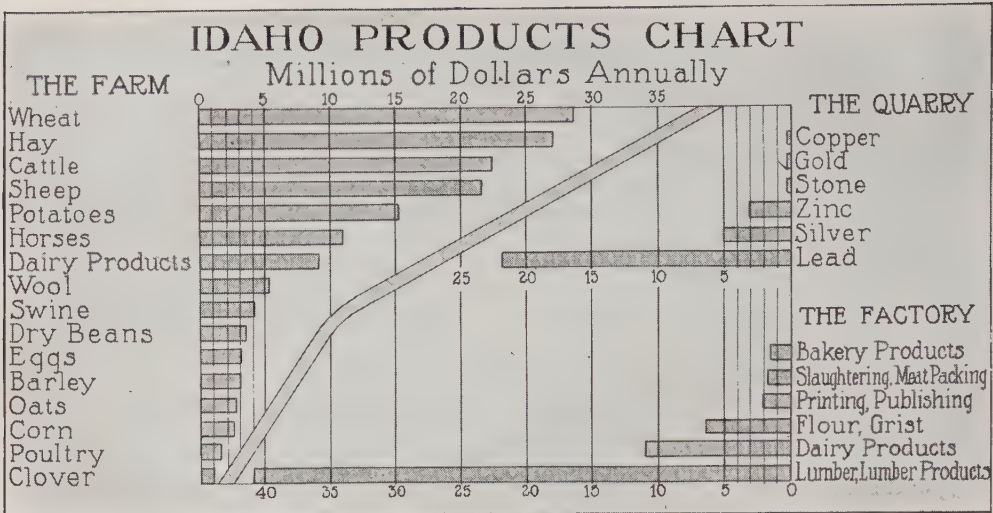
The structure is more than one-fifth of a mile in length.

It was the discovery of gold in 1860, in the Coeur d'Alene district, which started the first great rush of settlers toward this region. But at present the production of gold, although still important, is greatly surpassed by that of other metals, namely, lead, silver, zinc, and copper. The center of the industry is still the Coeur d'Alene district, where rich lead and silver ores are found. These mines are among the richest in the world. Lead and zinc form at least sixty-five per cent of the value of the mineral products of the state, and Missouri, Utah, and Idaho are the foremost lead-producing states of the Union. Next in importance comes silver; in the production of silver, Idaho ranks with Nevada, Montana, and Utah among the first four states of the Union. Gold to the yearly value of about \$1,000,000 is extracted, mainly in the basin of the Boise River, near the capital of the state, and in that of the Snake River. Extensive and rich copper fields have been discovered, and the production of copper is yearly increasing in value.

About ninety per cent of the phosphate-rock reserve of the country is located along the southeastern border of Idaho. Tungsten mines are being developed in Lemhi County in the Salmon River Mountain district.

Manufactures. As in every thinly settled and newly established community, the manufacturing industries are not very well developed. But even these have shared in the general advance, and shown a rapid increase. It is only natural that in a state like Idaho lumbering should be the leading industry. There are over 300 sawmills in the state. At Potlatch, in Latah County, Idaho possesses one of the largest lumber mills in the United States, and perhaps in the world. This mill has a capacity to produce 750,000 feet of lumber a day. The manufacture of flour is also of some importance, and beet-sugar factories are taking care of the increased growing of beets. Local cheese and milk-condensing plants are an outgrowth of the stock-raising industry.

Transportation. The mountainous nature of the country has been a great drawback in the building of railroads, but, nevertheless, the mileage more than doubled in the two decades following 1907. There are 2,885 miles of railroad in the state; the principal roads are the Oregon Short Line of the Union Pacific System; the Northern Pacific; the Chicago, Milwaukee, Saint Paul & Pacific; and the Great Northern. Idaho possesses a Public Utilities Commission, consisting of three



The figures represent averages for three years.

members, which investigates the rates charged by the railroads and express companies, and sees that these are just and reasonable. The members of this commission constitute also the State Tax Commission.

There is very little water transportation in the state, as its principal rivers present many obstructions and waterfalls. The greatest need of the present is the building of a railroad which would traverse the central portion of the state, establishing communication between east and west.

Government. Idaho is governed under a constitution adopted in 1889, just prior to its admission to the Union as a state. There have been many amendments to it.

The *legislative* power is vested in the usual two houses, a senate and a house of representatives. The house of representatives is composed of at least one member from each county, and it must never exceed three times the number of senators. The house has sixty-eight members and the senate forty-four members. The members of both houses are elected for a term of two years. Sessions of the legislature are held every two years.

In 1919 the legislature adopted a consolidated, or cabinet, form of government, with the governor at the head and under him nine departmental commissioners. An executive budget system for the state was also adopted at that time.

At the head of the *judicial* department is the supreme court, consisting of five justices, each elected by the people for a term of six years. In 1925 a state board of eugenics was created, and also a state coöperative board of forestry.

History. It was at the beginning of the nineteenth century that white men pene-

trated this region. In 1805 Lewis and Clark were the first to explore those parts which are now known as Idaho (see LEWIS and CLARK EXPEDITION). The town of Lewiston and the Clark River commemorate the names of these early explorers. But, with the exception of fur traders and prospectors, the region did not attract many settlers until 1860. In that year, Captain Pierce found gold in the region around Orofino. The news spread rapidly, and settlers from all parts rushed to the new Eldorado, as they had rushed to California a decade earlier.

Formation of a Territory. Three years later, the region was organized as the Territory of Idaho, which, however, comprised the whole of Montana and nearly the whole of Wyoming. In 1864 Montana and in 1868 Wyoming were separated from it, and the territory assumed its present size and area. Since that time the progress has been rapid and steady. For a few years the settlers suffered more or less annoyance from the Indians, but these were finally induced to part with most of their land and retire upon reservations.

Many Mormons settled in the southern part of the state, and their numbers excited such alarm that the legislature in 1883 passed a law depriving them of the right to vote. When, in 1893, the Mormon Church rejected polygamy as a necessary part of its creed, any Mormon having only one wife was again enfranchised.

Progress as a State. In 1889 the territory adopted a new constitution, and in the following year, July 3, 1890, Idaho was admitted as the forty-third state in the Union.

With the growth of the mining industry, conflict between the miners and the mine-owners became frequent. In 1892 a strike at the Coeur d'Alene mine lasted six months,



"Cathedrals of the Sawtooths." This mountainous view is in the heart of Idaho's famed summer playground.

QUESTIONS ON IDAHO

(An outline suitable for Idaho will be found with the article "State.")

What does the name *Idaho* mean, and to what does it refer?

What city name recalls the early Indian inhabitants of the territory? What is supposed to have been the original significance of the name?

Where is there a waterfall which surpasses Niagara in height?

What part did the mineral deposits have in determining the early history of the state?

How much larger was the original Territory of Idaho than the present state?

What is the most noticeable difference between the chart of religions of Idaho and that of any Eastern state?

What advantage do the farmers in the valleys derive from the heavy snowfalls in the mountains many miles away?

When was Idaho admitted to the Union? How many states have been admitted since that date?

What has been the stand of Idaho on the liquor question? On the suffrage question? Mention other legislation which proves the progressive character of the state.

What national monument has the state of Idaho?

How are the Indians cared for in the educational scheme?

What is peculiar about the waterways of Idaho?

Why is it true that Idaho has a Pacific seaport?

What region is suited for agriculture without irrigation?

What is the great transportation need of the state? Why are the rivers not more widely utilized for navigation?

How does the state compare as regards density of population with the country as a whole? If the population of New York and Idaho were exchanged, how much more densely would the latter state be populated than it is at present?

What are *buttes*? Where do they constitute a characteristic feature of the landscape?

Where are the sheep pastured in the summer? In the winter? Why is it possible in some places in this northern state for sheep and cattle to graze out-of-doors all winter?

Who were the first white men to explore this region? How have their names been honored in the state?

How many states are larger than Idaho? Have all the states which are larger a greater population?

How much above the lowest point in the state is the highest point? How does the average elevation compare with that of Colorado?

How does the state rank as regards production of wool?

What method is employed in the raising of wheat?

What are some of the great irrigation works of the state and in what respect is Arrowrock Dam notable?

Where is the largest single-unit sawmill in the world?

What are the chief minerals of the state? How does Idaho rank in its production of the two most important?

How does Idaho rank as a source of phosphate?

What is the value of the annual output of gold in the state?

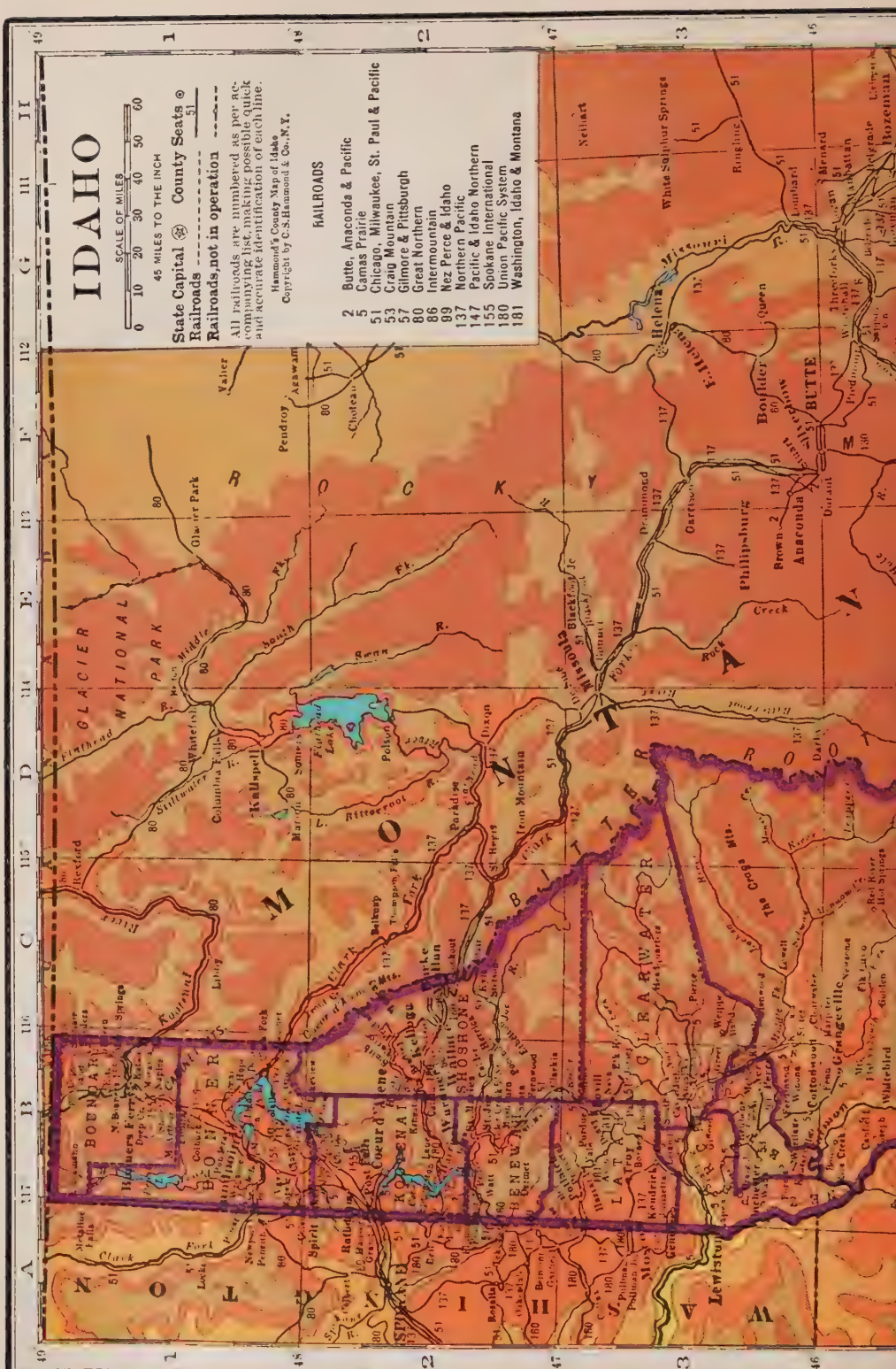
What is the extent of the negro population?

Is there any probability of a large development of manufacturing industry in the state? If so, what is the factor most favorable for such development?

In what respects does the government of Idaho differ from that of most states of the Union?

IDAHO

Aberdeen, (F7)...	471	Carey, (E6).....	250	Egin, (G6).....	130	Hailey, (D6).....	1,201
Accequia, (E7)....	398	Carmen, (E4)....	100	Elba, (E7).....	100	Hammett, (C7)...	200
Ahsahka, (B3)....	100	Cascade, (C5)....	299	Elk City, (C4)....	200	Hansen, (D7)....	278
Albion, (E7).....	388	Castle Creek, (B6)	100	Elk River, (B3)...	847	Hapster, (C3)....	100
Almo, (E7).....	100	Castleford, (D7)...	152	Emmett, (B6)....	2,204	Harrisburg, (C3)...	110
Alpha, (C5).....	100	Cataldo, (B2)....	100	Fairfield, (D6)....	280	Harrison, (B2)....	674
Alpine, (G6).....	200	Cavendish, (B3)...	100	Fairview, (F7)....	336	Harvard, (B3)....	100
American Falls,		Centerville, (C6)...	130	Farnum, (G6)....	239	Hatch, (G7).....	100
(F7).....	1,547	Central, (G7).....	100	Featherville, (C6)...	100	Hayden Lake, (B2)	100
Ammon, (G6)....	378	Challis, (D5)....	484	Felt, (G6).....	190	Hazelton, (D7)....	295
Apple Valley, (A6)	175	Cherry Creek, (F7)...	100	Ferdinand, (B3)...	255	Henry, (G7).....	112
Arbon, (F7).....	150	Chester, (G6)....	100	Fernwood, (B2)...	150	Heyburn, (E7)....	292
Archer, (G6)....	100	Chesterfield, (G7)...	150	Filer, (D7).....	1,012	Hill City, (C6)...	100
Arco, (E6).....	737	Chilly, (E5)....	110	Firth, (F6).....	100	Holbrook, (F7)...	100
Arimo, (F7).....	200	Clarkfork, (B1)...	325	Fishhaven, (G7)...	100	Hollister, (D7)....	159
Ashton, (G5)....	1,022	Clayton, (D5)....	100	Forest, (B3)....	140	Homedale, (B6)...	217
Athol, (B2).....	180	Clearwater, (C3)...	200	Forney, (D5)....	100	Hope, (B1).....	160
Atlanta, (C6)....	150	Cleveland, (G7)...	150	Fort Hall, (F6)...	1,500	Horseshoe Bend, (B6)	230
Avon, (B3).....	100	Clifton, (F7)....	234	Franklin, (G7)....	589	Idaho City, (C6)...	104
Bancroft, (G7)...	374	Coeur d'Alene,		Fruitland, (B5)...	230	Idaho Falls, (F6)...	8,054
Basalt, (F6).....	345	(B2).....	6,447	Fruitvale, (B5)...	100	Illo, (B3).....	263
Bates, (G6)....	100	Colburn, (B1)....	100	Garden Valley, (B5)	100	Indian Valley, (B5)	100
Bellevue, (D6)....	526	Corral, (D6).....	290	Gem, (C2).....	375	Inkom, (F7).....	200
Bennington, (G7)...	100	Cottonwood, (B4)...	610	Genesee, (A3)....	676	Iona, (G6).....	630
Bern, (G7).....	150	Council, (B5)....	388	Geneva, (H7)....	170	Irwin, (G6).....	150
Blackfoot, (F6)...	3,937	Craigmont, (B4)...	500	Georgetown, (G7)...	456	Jerome, (D7)....	1,759
Black Pine, (F7)...	100	Culdesac, (B3)....	397	Gibbonsville, (E4)...	150	Julietta, (B3)....	427
Bliss, (D7).....	175	Cuprum, (B4)....	100	Gibbs, (B2).....	100	Junction, (E5)....	100
Bloomington, (G7)	475	Dayton, (G7)....	225	Gifford, (B3)....	754	Kamiah, (C3)....	653
BOISE, (B6)....	21,393	Deary, (B3).....	316	Gilbert, (B3)....	100	Kellogg, (B2)....	3,017
Bonnars Ferry, (B1)	1,236	Declo, (E7).....	200	Gilmore, (E5)....	100	Kendrick, (B3)...	522
Bovill, (B3).....	589	Delamar, (B6)....	300	Glenns Ferry, (C6)	1,243	Ketchum, (D6)...	200
Bridge, (E7).....	100	Desmet, (B2)....	200	Glenwood, (C4)...	100	Keuterville, (B3)...	100
Bruneau, (C7)....	175	Dietrich, (D7)....	125	Gooding, (D6)....	1,843	Kimberly, (D7)...	501
Brunzell, (B6)....	100	Dingle, (G9)....	455	Grangeville, (C4)...	1,439	King Hill, (C6)...	100
Buhl, (D7).....	2,245	Downey, (F7)....	522	Grace, (G7).....	250	Kingston, (B2)...	100
Burke, (C2).....	1,000	Driggs, (G6)....	683	Grandview, (B7)...	414	Kippen, (B3)....	45
Burley, (E7)....	5,408	Drummond, (G5)...	115	Granite, (B1)....	250	Kooskia, (C3)....	403
Cabinet, (C1)....	150	Dubois, (F5)....	590	Grant, (F6).....	100	Kootenai, (B1)...	245
Caldwell, (B6)...	5,106	Eagle, (B6).....	150	Gray, (G6).....	100	Kuna, (B6).....	366
Cambridge, (B5)...	404	East Hope, (B1)...	223	Greer, (B3).....	200	Laclede, (B1)....	150
Cameron, (B3)...	100	Eden, (D7).....	359	Hagerman, (D7)...	327	Lago, (G7).....	200



IDAHO



State Capital County Seats

Railroads -----

Railroads not in operation - - - - -

All railroads are numbered as per accompanying list, making possible quick and accurate identification of each line.

Hammond's County Map of Idaho
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RAILROADS

- | | |
|-----|--|
| 2 | Butte, Anaconda & Pacific |
| 5 | Canas Prairie |
| 51 | Chicago, Milwaukee, St. Paul & Pacific |
| 53 | Craig Mountain |
| 57 | Gilmore & Pittsburgh |
| 80 | Great Northern |
| 86 | Intermountain |
| 89 | Nez Perce & Idaho |
| 137 | Northern Pacific |
| 147 | Pacific & Idaho Northern |
| 155 | Spokane International |
| 180 | Union Pacific System |
| 191 | Washington, Idaho & Montana |

IDAHO *Continued*

Lake, (G5).....	100	Mount Idaho, (C4) ..	100	Pollock, (B4).....	100	Spencer, (F5).....	100
Lakeview, (B2)...	100	Mullan, (C2).....	1,320	Ponderay, (B1)...	100	Spirit Lake, (B2) ..	940
Lamont, (G6).....	100	Murphy, (B6).....	100	Postfalls, (B2)....	576	Springfield, (F6) ..	150
Lane, (B2).....	200	Murray, (C2).....	600	Potlatch, (B3)....	600	Springston, (B2) ..	150
Lapwai, (B3).....	359	Murtaugh, (D7)...	100	Preston, (G7).....	3,235	Squirrel, (G6).....	100
Lardo, (B5).....	100	Nampa, (B6).....	7,621	Priest River, (B1) ..	545	Star, (B6).....	402
Lava Hot Springs, (G7).....	662	Naples, (B1).....	250	Princeton, (B3)...	200	Sterling, (F7).....	250
Leadore, (E5).....	300	Newdale, (G6)....	381	Quartzburg, (C5) ..	100	Stites, (B3).....	317
Leland, (B3).....	290	New Meadows, (B5)	141	Rathdrum, (A2)...	509	Stone, (F7).....	127
Lenox, (C6).....	100	New Plymouth, (B6)	400	Raymond, (H7)....	150	Sublett, (E7).....	100
Lewiston, (A3)...	6,574	Nezperce, (B3)...	677	Reno, (F5).....	100	Sugar, (G6).....	680
Lewisville, (F6)...	383	Niter, (G7).....	150	Reubens, (B3)....	176	Sweet, (B6).....	150
Liberty, (G7).....	100	North Pocatello, (F7).....	436	Rexburg, (G6)....	3,569	Teton, (G6).....	537
Lincoln, (G5).....	200	Notus, (B6).....	100	Richfield, (D6)...	333	Tetonia, (G6).....	250
Lorenzo, (F6).....	230	Nounan, (G7).....	100	Rigby, (G6).....	1,629	Thatcher, (F7)...	100
Lund, (G7).....	100	Oakley, (D7).....	1,273	Ririe, (F6).....	396	Thornton, (G6)....	250
McArthur, (B1)...	100	Orchard, (B6).....	100	Roberts, (F6)....	313	Thurman, (C6)...	100
McCall, (B5).....	307	Oreana, (B6).....	150	Robin, (F7).....	150	Treasureton, (G7).....	150
McCammon, (F7)...	476	Orofino, (B3)....	537	Rockcreek, (D7) ..	100	Troy, (B3).....	591
Mackay, (E6).....	857	Osburn, (C2).....	100	Rockland, (F7)...	344	Twin Falls, (D7) ..	8,324
Malad City, (F7)...	2,598	Ovid, (G7).....	150	Roseberry, (C5)...	113	Ucon, (G6).....	364
Malta, (E7).....	247	Oxford, (F7).....	100	Roswell, (B6)....	571	Ulysses, (D4)....	100
Marion, (E7).....	530	Ozone, (G6).....	300	Rupert, (E7).....	2,372	Vanwyck, (B5)...	279
Marysville, (G5)...	334	Paragon, (C2)...	100	Saint Anthony, (G5).....	2,957	Victor, (G6).....	277
May, (E5).....	100	Paris, (G7).....	1,333	Saint Charles, (G7)	400	Vollmer, (B3)....	249
Mayfield, (C6)...	100	Parker, (G5).....	495	Saint Joe, (B2)...	540	Wallace, (C2)....	2,816
Meadows, (B4)...	200	Parma, (B6).....	583	Saint Maries, (B2)	1,962	Wardner, (B2)....	704
Menan, (F6).....	323	Paul, (E7).....	527	Salmon, (E4)....	1,311	Warren, (C4)....	100
Meridian, (B6)...	1,000	Pauline, (F7)....	100	Salubria, (B5)....	300	Wayan, (G7).....	120
Middleton, (B6)...	535	Payette, (B5)....	2,433	Samaria, (F7)....	379	Weiser, (A5)....	3,154
Midvale, (B5)...	278	Pearl, (B6).....	39	Sandpoint, (B1) ..	2,876	Wendell, (D7)...	664
Milner, (E7).....	100	Pebble, (G7).....	100	Santa, (B2).....	100	Weston, (F7)....	452
Minidoka, (E7)...	253	Peck, (B3).....	191	Saelley, (F6)....	1,223	Whitebird, (B4) ..	500
Minkcreek, (G7)...	209	Picabo, (D6)....	100	Shoshone, (D7) ..	1,165	Whitney, (G7)...	100
Mohler, (B3).....	160	Pierce, (C3)....	220	Silver City, (B6) ..	410	Wilder, (B6)....	349
Montpelier, (G7)...	2,984	Pingree, (F6)....	150	Small, (F5).....	100	Wilson, (B6)....	100
Moore, (E6).....	100	Pioneerville, (C6)	100	Soda Springs, (G7)	935	Winchester, (B3) ..	745
Moravia, (B1)....	100	Placerville, (C6) ..	187	Soldier, (D6)....	266	Winona, (G4)...	100
Moscow, (A3)....	3,956	Plano, (G6).....	100	South Boise, (B6)	885	Woodland, (C3) ..	150
Mountain Home, (C6).....	1,644	Plummer, (B2)...	450	Southwick, (B3) ..	300	Woodruff, (F7)...	100
		Pocatello, (F7)...	15,001			Yellowjacket, (D5)	100

and was accompanied by riots and more serious conflicts between union and non-union miners. Federal troops had to be called in to restore order. Another strike, also accompanied by much violence, broke out in 1899, and also necessitated the use of the Federal troops. Bitter feeling continued long after this strike and culminated in the assassination of ex-Governor Steunenberg in 1905. The murder attracted national attention, and the chief officials of the Western Federation of Miners were arrested, charged with complicity in the crime. After a trial characterized by many sensational incidents, they were acquitted.

In 1896 an amendment to the constitution, granting the franchise to women on the same terms as to men, was approved by the people. Idaho adopted statewide prohibition in advance of the national amendment. From 1909 until 1916, the state was under local option. In 1912 an amendment to the constitution was carried, introducing the initiative, the referendum, and recall. In 1921 there was an effort to divide Idaho and include parts of it and of Washington and Montana in a new state, Lincoln, to add to the Union. The project failed.

Other Items of Interest. The wheat grown in Southern Idaho is of a variety particularly suited for the making of macaroni.

The Indians of the state, who are of seven different tribes, live on four reservations, on each of which a school is maintained.

Idaho has many mineral springs and hot springs, no fewer than eleven of the counties possessing them; water with a temperature of 165° flows from many wells at and near Boise.

The usual law of riparian rights (which see) does not hold good in Idaho, for all the waters of the state are reserved for public use.

The name Coeur d'Alene, which is mentioned several times in this article, is the French translation of an Indian tribal name, and means *heart of an awl* or *needle heart*. It was originally the name of a chief noted for his cruelty.

There is now developed in Idaho 270,000 horse power by hydroelectric plants, and there remains potential water power amounting to over 5,000,000 horse power.

The largest phosphate deposit in the world is in Idaho.

Related Subjects. The reader is referred in these volumes to the following articles:

CITIES AND TOWNS

For locations and populations of the most important cities and towns, see back of state map.

LEADING PRODUCTS

Alfalfa	Lumber
Clover	Sheep
Copper	Silver
Gold	Wheat
Lead	Wool

UNCLASSIFIED

Butte	Irrigation
Dry Farming	Mormons
Eugenics	Snake River

IDEOGRAMS, *i' de o gramz*. See **HIEROGLYPHICS**.

IDES. See **MONTH** (Days of the Month).

IDIOM, *id' ih um*. When we say, "They put up with grave injustice," instead of "They tolerate grave injustice," we are speaking idiomatic language. An idiom or idiomatic phrase is an expression whose implied meaning is different from the literal meaning of its parts. Other examples are: to come by (obtain); to bring about (accomplish); and to carry out (achieve).

We also apply the term to a form of speech peculiar to a language. The awkward expressions used by persons learning a foreign language are often the result of their attempts to translate literally what are really idiomatic forms. The literal translation of the German equivalent for "How do you do?" is "How does it go with you?" That of the French equivalent is "How do you carry yourself?" The mastery of idiom is one of the most difficult phases of learning a new language.

IDIOT, a person of such low order of intelligence that he has no power of attention or of self-control. Such a condition may be present from birth, or it may be induced by accident or neglect in infancy. In law, an idiot is one who from birth has been without understanding. He cannot be held accountable for commission of crime, cannot enter into any contract, or be held in any way responsible; he can, however, inherit property, which is thereafter held for him by a trustee. See **INSANITY**; **FEEBLE-MINDED**, **EDUCATION OF THE**.

IDOL, a representation of gods or of superhuman persons. The conviction that either a Supreme Being or a number of spirits are guiding



IDOLS FASHIONED FROM STONE

Used for worship in the islands of the West Indies.

earthly affairs has been implanted in the human breast since the beginning of history. The desire to see the gods, or at least to look at



images of them, was but natural. The conception of what the ruling spirit really was, varying of course according to locality, imagination, and tradition, was embodied in some image, which usually took the form of a man. Combinations of human and animal forms occurred, and even animal forms alone were not rare, but man from the earliest time has generally regarded the supreme power as a being in human form. Images were erected in prominent places, sometimes out-of-doors, sometimes in temples. To the beholders they symbolized the gods they worshiped; because in some countries there were held to be a great number of gods, numerous idols were made, each one representing some particular deity. After Christianity was proclaimed, idols were regarded by Christians as sacrilegious, but certain images with deep religious significance were retained as symbols to be venerated, and are so used in the Roman Catholic Church (see ICONOCLASTS).

Idolatry. It was not long before those early peoples who had made for themselves graven images, as symbols, began to regard those images as gods in truth. As gods, or as the abodes of the spirits, they were worshiped. A man in the presence of his idol felt himself literally in the presence of his god. The prophets of old warned the Jews against the practice of bowing down to idols of wood and stone. The protest was not directed against the symbol or image, but against the worship of the idol instead of what it represented.

Mohammed conceived such a dread of the effect of idolatry that the Koran expressly forbids the reproduction of the image of any living thing, whether it be in wood, stone, or metal, or a painting. Buddhism and Brahmanism still retain images, and their religious ceremonies closely approach a form of idolatry. On the west coast of Africa and among some inland tribes, a form of idolatry known as *fetish worship* is still common (see FETISH). Even inanimate objects are credited with great powers of evil and are worshiped according to the extent of their supposed influence.

IDYLL, OR IDYL, *i' dil*, a kind of poem representing simple scenes of pastoral (rural) life. But it is not essential that the idyll be exclusively pastoral, as many of the famous idylls of ancient poets are not wholly rural in character. To constitute a poem of this class, it should present a complete picture in small compass, as distinguished from the formal epic (see EPIC). However, Tennyson's *Idylls of the King* (which see) is an epic in style and treatment, and romantic and tragic in subject matter, as shown by the lines given below;

THESE WERE WORSHIPED

Ten idols dating from a very early period in Mexico. Their names and their significance are not known to-day.

it is therefore difficult to draw an exact line as to what may or may not be called an idyll:

Nor ever yet had Arthur fought a fight
Like this last, dim, weird battle of the west.
A deathwhite mist slept over sand and sea:
Whereof the chill, to him who breathed it, drew
Down with his blood, till all his heart was cold
With formless fear; and ev'n on Arthur fell
Confusion, since he saw not whom he fought.
For friend and foe were shadows in the mist,
And friend slew friend not knowing whom he slew;
And some had visions out of golden youth,
And some beheld the faces of old ghosts
Look in upon the battle; and in the mist
Was many a noble deed, and many a base.

IDYLLS OF THE KING. Tennyson's poem of this title is a beautiful epic of Arthur, the hero-king of the Britons (see **ARTHUR, KING**). It was completed in 1889, after the poet had worked on the stories at intervals for a period of fifty years, and is divided into twelve parts, or idylls. Each idyll centers about a particular incident in the life-drama of the great personage who dominates the entire narrative. Beginning with *The Coming of Arthur*, the poet carries the story through the building up of the kingdom; the establishment of the Round Table; the unhappy love of Guinevere for Lancelot (which see), the king's trusted knight; the exploits of the knights in their quest for the Holy Grail; the remorse and flight of the queen; and the final triumph of the king's enemies and his own death, in the "last, dim, weird battle of the west."

In *The Passing of Arthur*, the closing idyll of the series, the poet strikes the high notes of his rich fancy and gift for exquisite verse-making. The simple, tender language of the king as he lay moaning in his tent is an admirable illustration of Tennyson's quieter mood:

I found Him in the shining of the stars,
I mark'd Him in the flowering of His fields,
But in His ways with men I find Him not.

Again, there are passages of splendid beauty and of rich, imaginative quality, a striking example being the description of the sword Excalibur as it was flung into the sea by Sir Bedivere, in response to repeated commands, as the king lay dying:

The great brand
Made lightnings in the splendor of the moon,
And flashing round and round, and whirl'd in an
arch,
Shot like a streamer of the northern morn,
Seen where the moving isles of winter shock
By night, with noises of the Northern Sea.

IGLOO, *ig' loo*, the Eskimo snow house. See **ESKIMO**.

IGNATIUS, *ig na' shih us*, SAINT, bishop of Antioch, one of the early Christian martyrs. He is credited with the authorship of seven Greek epistles bearing his name, which are

included among the works of the apostolic fathers. These give evidence of his earnest, devoted spirit and intense religious enthusiasm. Ignatius is supposed to have been born in Syria, about the middle of the first century, and to have been a disciple of the apostle Saint John. About A.D. 107, at the command of Emperor Trajan, he was thrown to the wild beasts in the arena at Rome.

IGNATIUS OF LOYOLA. See **LOYOLA**, **IGNATIUS OF**.

IGNEOUS, *ig' ne us*, **ROCKS** are those rocks which were formed by the cooling and solidifying of molten material, either within or at the surface of the earth. Igneous formations vary in position, texture, and composition. *Intrusive* rocks are those which have solidified before reaching the surface of the earth; *extrusive* rocks are those which have cooled after reaching the surface. When an intrusive mass fills a more or less vertical fissure in another rock mass, it is said to form a *dike*; a flat, extended mass of molten material solidifying between layers of stratified rock is called a *sheet*, or *sill*. Intrusive rocks, not being exposed to the surface, cool slowly and exhibit a crystalline structure.

Lavas that flow out of volcanoes and quickly solidify on the surface may be either crystalline or glassy, the character depending upon composition and rate of cooling. As the temperature of the lava falls, it becomes more viscous, until finally the mass is too viscous to permit crystals to form. Lavas of the composition of rocks, such as granite (rhyolite), lose their fluidity at a higher temperature than do those of the composition of gabbro (basalt); consequently, the former are more likely to be glassy than the latter. When ejected with violence, lava masses form lumps of varying size, ranging from volcanic dust to pieces of considerable size, called volcanic bombs. Sometimes the ejected rock contains innumerable pores formed by the expansion of steam or gas. This rock froth is called pumice. The following are the most important minerals found in igneous rocks: quartz, the feldspars, mica, pyroxene, amphibole, olivine, and magnetite, and in certain rocks, nephelite and leucite. A.J.

Related Subjects. The reader is referred in these volumes to the following articles:

Basalt	Granite
Diabase	Porphyry
Geology	Pumice
Gneiss	Rock

IGNIS FATUUS, *ig' nis fat' u us*, a singular luminous appearance resembling a pale flame, sometimes seen hovering over marshy places and, also, according to very doubtful tradition, in churchyards at night. It is called will-o'-the-wisp, spunkie, Jack-o'-lantern, and other names, in the different sections in which it is said to occur. There has always been some

doubt as to its actual existence, and many scientists have investigated the phenomenon. They have never arrived at satisfactory conclusions, but those who firmly believe in its existence account for it as the result of spontaneous combustion of gases.

Derivation. The expression *ignis fatuus* is from the Latin language, and means *foolish fire*.

IGNITION, *ig nish' un*. See **AUTOMOBILE** (The Engine); **GAS ENGINE**.

IGORROTE, *e gohr ro' tay*, or *e gohr roht'*, a tribe inhabiting portions of Luzon, one of the Philippine Islands. The name means *mountain people*, and was at one time indefinitely applied to the inhabitants of mountainous parts of several of the islands in the Philippine group. Through generations of training, the Igorrotes became a warlike race, and some of them were headhunters until subdued by United States troops and induced to adopt the arts of peace. They are especially

the tips; for a large dewlap, or pouch, below the head and neck; and for a ridge of spiny, pointed scales extending from neck to tail.



Photo: U & U

AN IGUANA

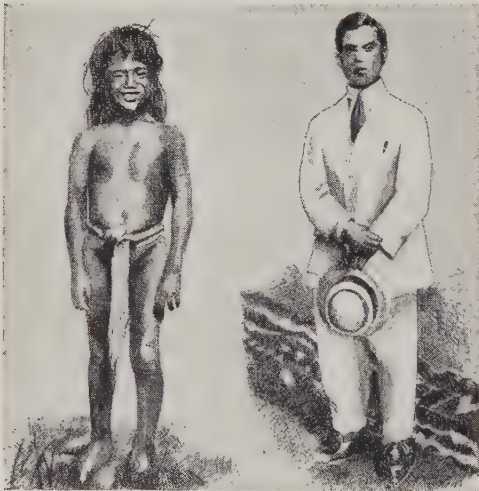
He became a New York resident, in the Bronx Zoo, because he fell into the Panama Canal and was rescued by a sailor.

Most of these lizards are greenish in color and live in trees, and some have the power to change their coloration, in the same way as the chameleon (which see). The species vary in length from a few inches to several feet. The *desert iguana*, or *keel-backed lizard*, frequents the desert regions of Southwestern United States and Northern Mexico. It is about a foot long, and has a thick body, very small head, and long, tapering tail. Its scales are keeled and are larger on the tail than on the body. The *common iguana* of tropical Central and South America and the West Indies grows to be six feet long, but is a timid, somewhat stupid creature, and easily caught by the natives, who prize its flesh. It has a fondness for branches of trees overhanging water, into which it leaps for safety when frightened. Iguanas are now found but rarely in the West Indies. An iguana of the Galapagos Islands is chiefly aquatic, and lives on seaweed. A land species of this region digs burrows in the ground. See **LIZARD**.

L.H.

Scientific Names. The iguana family is known scientifically as *Iguanidae*. *Iguana* is the name of the type genus. The desert lizard is *Callisaurus draconoides*; the common iguana, *Iguana tuberculata*.

IGUANODON, *ig wahn' o don*, a fossil lizard found in Europe, deriving its name from the similarity of its teeth to those of the iguana, (which see). The species were of colossal size, some individuals having been thirty feet long. The head was large and narrow, the jaws were heavy, and were supplied with very large teeth. The fore limbs, which had four toes and a spur and were much shorter than the large, three-toed hind legs, were used for grasping and holding, rather than for walking. The tail was long and heavy, in this respect like that of the kangaroo, and it steadied the animal when it was standing or swimming. The iguanodon lived in great numbers in the swampy regions of



PAST AND PRESENT

The first picture is that of an Igorrote boy at the time the Philippines passed to American control; all of his tribe were of his stage of civilization. The second picture is of the same boy, after fewer than ten years under the influence of American teachers.

skilful as agriculturists. Some of their houses have two stories, the lower being used as workshop and living room, the upper serving as a storeroom and kitchen. The number of individuals in the tribe is estimated at 211,500. See **PHILIPPINE ISLANDS**.

C.W.

IGUANA, *ig wah' nah*, the name of a family of grotesque-looking lizards, of which all but three genera are found in North and South America. The others occur in Madagascar and the Fiji Islands. The typical iguanas are remarkable for their teeth, which are blade-like at the roots and have sawlike edges toward



From the painting by Rubens

"THE WRATH OF ACHILLES" (SEE PAGE 3350.)

England and Belgium. The best-preserved specimen, which is a practically perfect skeleton, was found in Belgium, and, as mounted in the British Museum, is fourteen feet high and twenty-eight feet long. See DINOSAURIA.

W.N.H.

IGUASSU, *e gwah soo'*, **FALLS**. See SOUTH AMERICA (illustration); PARANA RIVER.

I.H.S. These initials, so often seen upon the altar cloths in Episcopal and Roman Catholic churches, are often mistaken for the initials of the first three words in the Latin phrase *In hoc signo vinces*—"By this sign thou wilt conquer." They are indicative, however, of the Latin *Jesus Hominum Salvator*, meaning "Jesus, the Saviour of men."

IJSSEL, *is' el*, **RIVER**. See NETHERLANDS, THE (The Country).

IKHWAN, *ick' wahn*. See WAHHABIS.

IK MARVEL, the pen name of DONALD GRANT MITCHELL (which see).

IKON, a variant of *icon*. See ICONOCLASTS.

ILE DE FRANCE, *eel deh frahNs*, once the name of the present Mauritius (which see).

ILEUM, a division of the small intestine. See ABDOMEN, illustration; DIGESTION, illustration.

ILEX, *i' leks*, a species of oak. See OAK.

ILIAD. This noble epic, regarded by many as the greatest ever written, is ascribed to the ancient Greek poet, Homer.



IGUANODON

As it is supposed to have appeared.

Whether Homer wrote it, or whether it is actually a folk-epic built up through generation after generation and given its final form by Homer; whether, indeed, there ever lived such a person as Homer—these questions have been studied by some of the world's greatest scholars, and are still unanswered. The quantity of literature which has grown up about this one poem is enormous, and still men's interest in it continues.

The Story. The twenty-four books of the *Iliad* deal with the Trojan War, but not with all of it. The causes, the early events, and the final outcome of that struggle, all of which must be understood if the poem is to be appreciated, are treated in separate articles (see list below).

Sing me, goddess, the wrath, the wrath of Pelian Achilles;
Ruinous wrath, which laid unnumbered woes on the Grecians;

begins the poem, and the greater part is taken up with a description of the wrath of the great Achilles over an insult offered him by Agamemnon, and with the tragic results of that wrath to the Greeks. In all, only about forty days are covered.

Sulking in his tent, Achilles hears with indifference of the repeated defeats which the Greeks have met because of his absence. At length the Trojans, secure in the feeling that Achilles hates his commander, Agamemnon, more than he despises them, prepare to set fire to the Grecian camp. Patroclus, the kinsman and best-loved friend of Achilles, prevails upon Achilles to lend him his armor, and with it proceeds to battle. His death at the hands of Hector rouses Achilles, who dons a new suit of armor made for him by Vulcan, and in his turn, meets and kills Hector. The body of the brave Trojan he drags at his chariot wheels, but at length yields to the pleas of Priam, the aged father of the hero, and gives it up. With an account of the funeral rites, the poem concludes; there is no word of the wooden horse by which the Greeks finally brought about the destruction of the city. Throughout, the gods take a prominent part, some helping the Greeks, others the Trojans.

Its Value. It is not simply that the *Iliad* tells a fascinating story in a straightforward, simple way, nor that its thought is consistently lofty and its lines swinging and majestic; it is, in addition to all this, a record of antiquity, and very much that is known about the modes of life and of thought in those far-away times has been learned from its pages.

Related Subjects. The following articles in these volumes will repay reading in this connection:

Achilles	Hector
Aeneid	Helen of Troy
Agamemnon	Homer
Epic	Menelaus

Mythology
Odyssey
Paris

Troy
Ulysses
Wooden Horse

ILIJIC, *ili' ich*, the family name of a father and two sons, natives of Serbia, all of whom were writers. The father's given name was Jovan (1823-1901); his sons were Dragutin (born 1858), and Voyislav (1862-1894). The father was also a jurist; he became a member of the Serbian Supreme Court and for four years was Minister of Justice.

ILIUM, the hip bones, called by anatomists the *ossa innominata*, is a double bone, one on each side of the body, giving form to the hips. In the infant the bone is floating, but later it unites on each side to the pubis in front and to the ischium behind and below. See **PELVIS**.

ILIUM. See **TROY**.

ILL, a river in the French provinces of Alsace and Lorraine, important because of numerous cities along its course. These are Mülhausen, Colmar, Schlettstadt, and Strassburg—names reminiscent of the period when the provinces were German-owned. The river flows into the Rhine.

ILLAMPU, *e lyahm' poo*, a peak in Bolivia. See **BOLIVIA** (The Land and Its Rivers); **ANDES**.

ILLECILLEWAET, *il e sil' e wate*, **GLACIER**. See **SELKIRK MOUNTAINS**.

ILICCIUM, *il lish' ih um*, a genus of trees and shrubs of the magnolia family. The most important is the star anise.

ILLIMANI, *eel ye mah' ne*. See **BOLIVIA** (The Land and Its Rivers); **ANDES**.

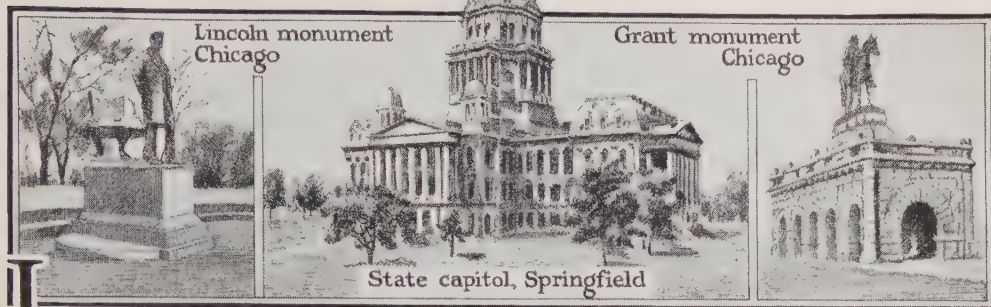
ILLINGTON, MARGARET (1881-), an American actress who achieved success in emotional rôles. She was born at Bloomington, Ill. Her maiden name was MAUDE LIGHT, the name *Illington* being a combination of the names of her native state and city. She studied dramatic art in Chicago, and made her first professional appearance with James K. Hackett in a small part in *The Pride of Jennico*; later she played the heroine of the same drama. As leading woman to E. H. Sothern, in *If I Were King*, and as Henriette, in the all-star cast of *The Two Orphans*, she gained fresh honors. In 1907 she appeared as joint star with Kyrle Bellew in *The Thief*. After her divorce from Daniel Frohman, she married Edward J. Bowes, of Seattle, Wash., in 1909. For a time she retired from the stage, but she returned to it in *Kindling*, a new success. Miss Illington had leading rôles also in *The Lion and the Mouse*, *His House in Order*, *The Lie*, *Within the Law*, and other plays, of more than usual character.

ILLINIUM, *il in' ih um*, the first chemical element to be discovered in the United States, was isolated by Professor B. S. Hopkins of the University of Illinois, in 1926. It was given the symbol *Il*. In the periodic

table, illinium occupies the number 61 [see CHEMISTRY (the elements)]. The element was obtained from monazite, a material used in the manufacture of gas mantles.

Illinium belongs to that group of rare-earth elements to which belong several employed for the incandescent part of gas mantles.

T.B.J.



ILLINOIS, *il ih noi'*, or *il ih noiz'*. This great North-Central state of the American Union holds a prominent place in the nation, geographically and historically. It is centrally located, and is the meeting place of the great railway systems of the West and East. Within the state, or bordering it, are three of America's historic waterways, the Ohio, the Mississippi, and the Illinois, while at its northern gateway lie the Great Lakes. The state contains the city of Chicago, which is the second in size in the nation and the fourth in the world.

A hundred years ago, Indians roamed its prairies in bands of thousands. Two famous chieftains, Tecumseh and Black Hawk, hold important places in the history of the state and nation. The names of Joliet, Marquette, La Salle, Tonty of the Iron Hand (in whose forge at Starved Rock the first Illinois coal was used), Hennepin, all suggest that the fleur-de-lis of France should bloom in the gardens of Illinois, in memory of those hardy French explorers who first discovered and settled the present state.

Early in the story of Illinois appears George Rogers Clark, who, with a ragged, dauntless band, captured this territory after England had become its master. Following him are the first pioneers, hardy Southerners who came down the Ohio in barges, flatboats, on foot, or in ox carts, to the new land in the West.

The farmers of to-day use the tractor plows and harvesters on their prairie farms with little thought of the clumsy, thousand-pound plow drawn by oxen with which Oramel Clark, over a hundred years ago, first broke the virgin prairie sod. His crude plow was quickly improved; soon plows and oxen were seen everywhere, and the conquest of the Illinois prairies began.

In the very heart of Illinois' history is the name of Abraham Lincoln, who came, a pioneer, to its prairies, went from them to the Presidency of the United States, and was returned to Illinois for his last, long sleep.

Size and Location. In size, Illinois ranks twenty-third among the states, having an area of 56,665 square miles, a little more than one-fifth that of Texas. Its length from north to south is 385 miles, its greatest breadth, between Vermilion County on the east and Adams County on the west, is about 218 miles. The history and industrial development of Illinois reflect the advantages of its favorable location. With Lake Michigan on the northeast, the Mississippi River all along its western border, the Wabash River on the southeast, and the Ohio on the south, Illinois has had none of that remoteness from which a state so far inland might be supposed to suffer. Over these waterways, before a network of railroads spread over the state, the products of its remarkably fertile soil were easily dispatched to the populous regions far to the east and to the south.

The Ordinance of 1787 (which see) had already determined the boundaries of the territory, but when Illinois became a state in 1818, its northern line was changed, owing to the efforts of Nathaniel Pope. This delegate in Congress from the Territory of Illinois suggested that the northern line be moved farther north. Its rivers, he said, link Illinois naturally to the South and West; an outlet on Lake Michigan would give a contact with the Eastern states and link Illinois with the North, South, and East. And to-day Illinois is also a gateway to the Western states, which then were non-existent.

The People. At the date of admission of Illinois as a state (1818), there were relatively few people north of Springfield. The earliest settlers had been, of course, the French; then many of Clark's soldiers settled in the land they had conquered for the colonies. The greatest flow of population had been from Kentucky and Virginia, by way of the Ohio River. It was in this migration from the south that the young Abraham Lincoln came to Illinois. The northern part of the state did not

develop until after the completion of the Erie Canal, after which settlers began moving northward, and many New Englanders came westward into Illinois. Not until five years after the opening of that waterway was Chicago platted; in 1830 that modest settlement covered less than one-half of a square mile, and its voting population numbered twenty-seven.

Illinois ranks third among the states of the Union in population, none of the great states to the west of the Mississippi, and only New York and Pennsylvania among the Eastern states, surpassing it. The average density of population in 1920 was 115.7 to the square mile, but this figure does not convey a correct impression, for about two-fifths of the people live in the one city of Chicago. The population of the state was 6,485,280 in 1920, by the Federal census; estimate, 1929, 7,400,000.

Illinois has been one of the states toward which immigrants have flocked in large numbers; nearly one-fifth of its population is foreign born, and less than half is of native parentage. Of the foreign element, the Germans are the most numerous, and immigrants from the British Isles and from Canada rank second. Poles, Russians, Swedes, Italians, and Czechs are next in number, while almost every foreign country has sent hundreds or thousands of its people to Illinois.

Illinois was named for the Illinois Indians, to whose home in the region many names bear witness—Kaskaskia, Peoria, Michigan, and above all, Starved Rock; relics of the Indians are found in various places, those found in the Cahokia Mound being the most noteworthy. To-day, less than 200 Indians remain in the state where La Salle and Tonty found thousands.

The urban population, that is, those living in cities of 2,500 or more, numbers nearly sixty-eight per cent, while over half the population lives in cities of 25,000 or more. The largest of these are Chicago, Peoria, East Saint Louis, Rockford, Springfield (the capital), Decatur, Joliet, Evanston, Aurora, Quincy, Danville, and Elgin. Two of the largest villages in the world, Oak Park and Cicero, each with over 50,000 people, are suburbs of Chicago.

Religion. As in most states with a large urban population, the Roman Catholic Church is very strong, comprising nearly half of all communicants; the various Methodist churches are next to the Catholic in point of strength. Among the other Protestant churches, the Lutheran is particularly noteworthy, and its strength is accounted for by the very considerable German and Scandinavian population.

Education. The state has an excellent free public-school system which dates from 1855.

The state percentage of illiteracy is only 3.4. Fourteen other states show a better average, but were it not for the negroes, with their percentage of 6.7, and the foreign-born whites, with eleven, the percentage would be but a little more than one per cent (see **ILLITERACY**).

The first schools in Illinois would seem very queer to children of to-day. The schoolmaster, whose qualifications were to know the three R's, to make a good quill pen, and to know the use of a birch rod, went from house to house soliciting pupils. If a family had many children, the father sometimes paid for two, and all the children took turns, by twos, at attending the school. In the log cabin school, greased paper furnished windowpanes, and log slabs the seats. To-day, in addition to the usual range of schools from kindergarten to university, the state has in the rural districts numerous consolidated schools; provision for the education of defectives; and summer schools, open-air schools, and schools for tubercular children. The institutions for higher education number twenty-nine colleges, three noted universities, and five teachers' colleges, the latter located at Carbondale, Charleston, De Kalb, Macomb, and Normal. Among the institutions worthy of note are Lewis Institute, at Chicago; McKendree College at Lebanon; De Paul University (Catholic) at Chicago; Illinois Wesleyan University at Bloomington; Illinois Women's College at Jacksonville; James Milliken University at Decatur; and Lake Forest College.

The following are the outstanding institutions of the state:

Armour Institute of Technology, at Chicago, was founded by Philip D. Armour, the packer, in 1892. Courses are offered in all branches of engineering, in architecture, and in academic subjects. There are day and night classes.

Bradley Polytechnic Institute, at Peoria, is a non-sectarian, privately endowed college, which confers the A.B. and B.S. degrees. In addition to general college and pre-medical courses, it has special departments in home economics and manual arts, including courses in automobile mechanics, electricity, mechanical drawing, metal-working, and wood-working. The college was founded in 1897.

Knox College, at Galesburg, is a non-sectarian, coeducational institution, one of the pioneers of the Middle West, founded in 1837. One of the Lincoln-Douglas debates was held on its campus in 1858, and repeated, in commemoration, in 1928. Besides the course in liberal arts, the college has an excellent conservatory of music.

Loyola University, Roman Catholic, was founded at Chicago in 1870 as Saint Ignatius College, and changed to Loyola in 1909. It has departments of law, medicine, pharmacy, engineering, sociology, arts, and sciences.

Northwestern University. See article, that title.

Rockford College, at Rockford, is a woman's college founded in 1849. It is non-sectarian. Besides liberal arts, there are courses in music, art, education, home economics, and secretarial training.



Originals owned by Chicago Historical Society

COSTUMES WHEN ILLINOIS WAS YOUNG

At left, bonnet and embroidered fichu, worn by Mrs. Thomas Mather, a Kaskaskia hostess, in 1824 (the bonnet is shown on a wax head). At right, a wedding dress of 1850 (shown on a wax figure).

University of Chicago. See article under the title CHICAGO, UNIVERSITY OF.

University of Illinois, one of the largest and most important universities in the United States, occupies a campus of 400 acres, between Urbana and Champaign. Henry W. Chase was called from the University of North Carolina in 1930 to become president.

The university is the outgrowth of the Illinois Industrial University, founded in 1867, its present name having been adopted in 1885. Since 1870 women have been admitted as students and have maintained since that time an average of about one-fifth of the student body. The colleges of medicine and dentistry and the school of pharmacy are located in Chicago; all of the other departments are on the Urbana-Champaign campus. The latter comprise the colleges of liberal arts and sciences, agriculture, engineering, law, commerce, and education, the school of music, and the graduate school.

There is a summer session of eight weeks, offering opportunities to teachers. In connection with the university are maintained the research and educational hospital in Chicago, the state laboratory of natural history, the state geological survey, the state water survey, the agricultural experiment station, the engineering experiment station, the Illinois historical survey, and the cooperative investigation of Illinois coal problems and mine-rescue station. The state farm lands cover over 2,000 acres.

A generous system of scholarships is maintained, whereby students who win in competitive examinations have an opportunity to complete the regular courses without paying tuition.

Charitable and Penal Institutions. In recent years, constantly increasing attention has been paid to the administration of these institutions,

conducted under the state department of public welfare. The legislature recently made a thorough canvass of the methods used with success in other states, and the result was the appointment of a Department of Public Welfare, which was given the right to inspect and criticise the administration of every state charitable and correctional institution. Auxiliary boards have a similar power in each county. For the study of mental and other cases found among the charitable institutions, the state maintains the research and educational hospital in Chicago in cooperation with the medical department of the university, the institute for juvenile research, and divisions of visitation of adult blind and of children. There is also, at Dunning, a state psychopathic institute (established in 1906 and widened in its scope in 1919), which has as its object continual study into the causes and treatment of insanity. Advanced methods, such as indeterminate sentence and the parole system, have also been used in connection with the penal institutions, while efforts have been made to check the growth of crime among the young by means of juvenile courts (which see). The honor system, which has attracted much favorable attention in some of the Western states, has been tried at the state penitentiary at Joliet, but not with entire success.

The state penal and correctional institutions are the penitentiaries at Joliet and at Menard;

also a new penitentiary at Stateville; the State Farm at Vandalia; the State Reformatory at Pontiac; the Saint Charles School for Boys; and the state training school for girls at Geneva. The charitable institutions include nine hospitals for the insane, at Kankakee, Chicago, Anna, Jacksonville, Elgin, Watertown, Peoria, Chester, and Alton; the state school and colony for the feeble-minded at Lincoln; a colony for the insane, feeble-minded,

and epileptic at Dixon; the soldiers' and sailors' home at Quincy; the soldiers' orphans' home at Normal; the soldiers' widows' home at Wilmington; the schools for the deaf and the blind at Jacksonville; the industrial home for the blind at Chicago; and the eye and ear infirmary at Chicago. In the official names of most of the institutions, such titles as "insane" and "feeble-minded" have been dropped, as not in accord with modern thought.

Physical Features and Resources

The "Lay of the Land." Illinois is one of the most level states in the Union. It has a flat or undulating surface and slopes gently to the south and southwest. Its vast stretches of rolling, grassy land have earned for it the title of the PRAIRIE STATE. All but the southern portion of the state was at one time covered with the great glacial ice sheet, and to this fact is due the level character of the land and the great fertility of the soil. The southern or non-glaciated area is very different in appearance from the northern part of the state, for its hills are rough and rocky instead of rounded, its rivers flow through miniature canyons, and its soil over the limestone rock is thin. The highest point in Illinois, in the extreme north on the Wisconsin border, is 1,241 feet above sea level, and its lowest, at Cairo on the Ohio River, is 267 feet above the sea. The extreme southern lowland section is known as "Little Egypt"; some say because in the early days it was the corn-growing region, and the northern settlers "went down into Egypt" for the corn which was so important to man and beast. It is thought that it was here that Dickens, in *Martin Chuzzlewit*, planted his "Eden," with its swamps and miasma and resulting backwardness.

The average altitude of the state is about 550 feet above sea level, and the chief elevations above that height are in the northwest and in the south. In the latter section, crossing the state, there is a ridge from six to ten miles wide, 700 to 800 feet in altitude, and rising at times to a height of 1,040 feet. This is in reality a spur of the Ozark Mountains, and constitutes scenically the most beautiful part of the state, with its picturesque valleys, wooded ravines, and sloping stretches clothed with hardwood forests. The forests cover but a small proportion of the state's area; a forestry act passed in 1925 carries an appropriation of \$100,000 to be applied toward the reclamation of forest lands, under the newly created department of conservation. The oak is the state tree, and the wood violet, which grows in the forested areas that follow the banks of the streams, is the state flower.

Despite its low-lying position, the state has for the most part excellent drainage. No

large territories are waste because of marshes, for there are within its borders, no fewer than 275 streams, flowing into the Mississippi, the Wabash, or the Ohio. The Chicago River, very small but very important, formerly emptied into Lake Michigan, but the Drainage Canal turned its current so that to-day its waters find their way finally to the Mississippi. The greatest river within the state is the Illinois, which drains over half the area of the state. It is quite impossible, in this day of railroad travel, to estimate the part which this stream played in the early history and development of Illinois. The first white men who visited the state found their way down this river, and later it was the highroad for the products of its extremely fertile valley region—a region which to-day supports a large proportion of the population of the state. Near Utica, on the Illinois, where the bluffs rise tall and sheer from the river, is one of the most picturesque spots in the state, as well as one of the most interesting historically—Starved Rock, where a little band of Indians once made their last stand and starved rather than surrender to their enemies. The surrounding territory has been created a state park. Near it is Deer Park, another of the beautiful small areas of the state, which in its maze of miniature canyons has surprises to offer even to those who have seen the great canyons of the West. In some sections, the river flows between such low banks that floods are frequent. Peoria, Beardstown, and other places have suffered severely from such floods. Other important rivers are the Desplaines and Kankakee, which unite to form the Illinois; the Fox, Rock, Big Muddy, Kaskaskia, Sangamon, Little Wabash, and Embarrass. Spoon River, in the west-central part of the state, has been made famous by Edgar Lee Masters' *Spoon River Anthology*.

Illinois, unlike its neighbors, Wisconsin and Michigan, has but few lakes, Fox Lake and Grass Lake being practically the only two of any size and importance. Both are important summer resorts about forty miles from Chicago. Grass Lake in late summer is a vast lotus bed. Peoria Lake is but an expansion of the Illinois River caused by the sediment deposited by a tributary stream.

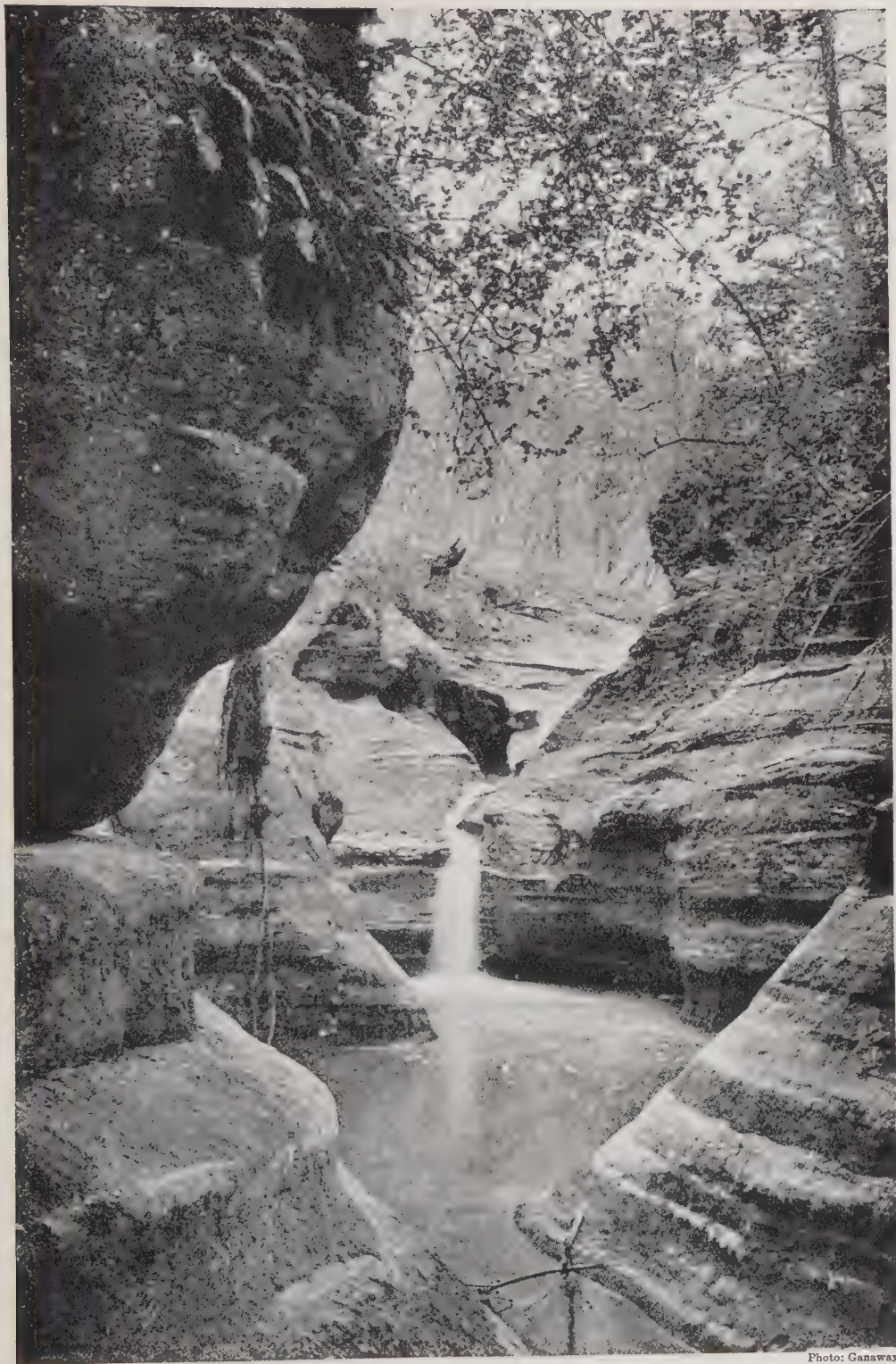
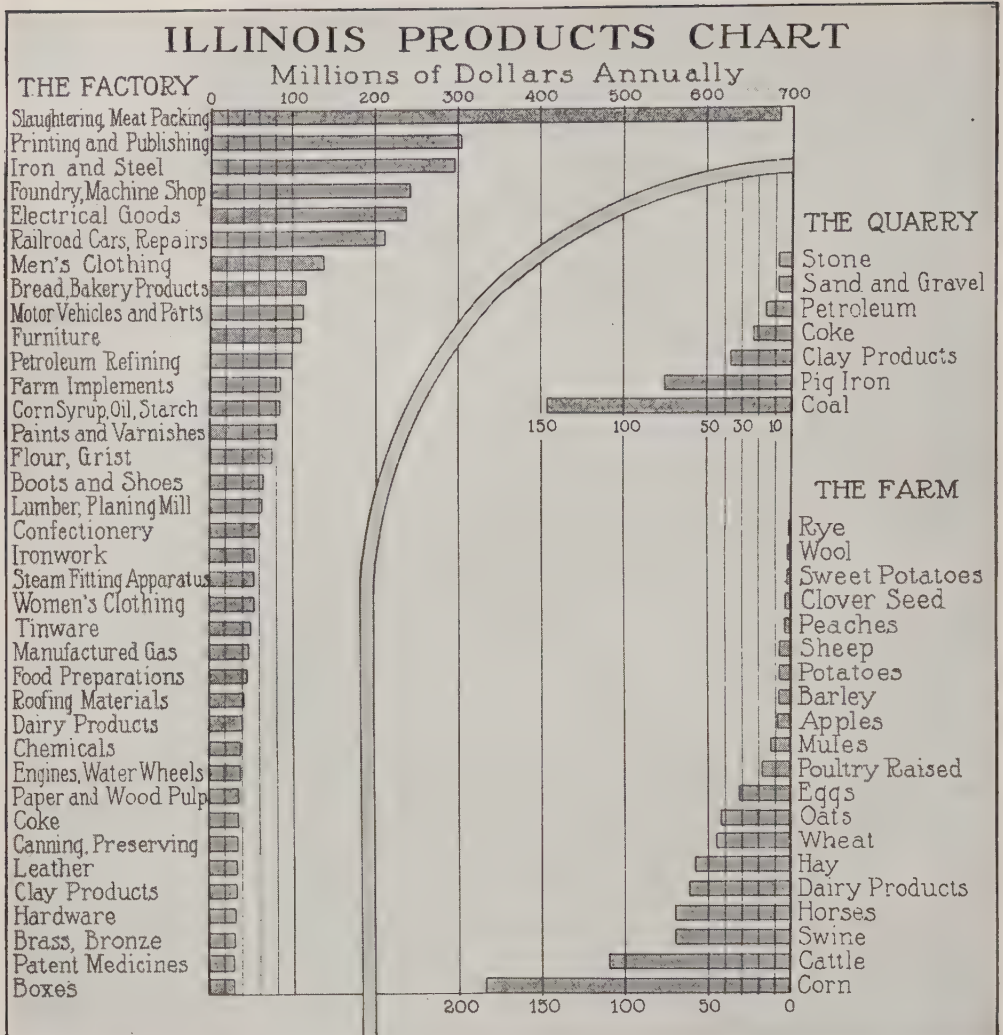


Photo: Ganaway

IN THE PARK AT STARVED ROCK

3355



Climate. In most parts of the state, the summers are very warm and the winters quite cold. Except in the northeast section, around Chicago, the Great Lakes exert very little influence on the climate. As in all states which have a considerable north-and-south length, there is a noticeable difference in the means of temperature in the extreme regions, the average in the south being 58° and that in the north but 47° . The range of temperature is greater in the north than in the south. The lowest temperature ever recorded in the state was 32° below zero, in the northwest portion, in February, 1905, while the highest, recorded at Centralia in July, 1901, was 115° . Violent changes are common in the state, for no mountain chains interfere with the sweep of the warm breezes up the Mississippi Valley, or with the cold winds down from the north.

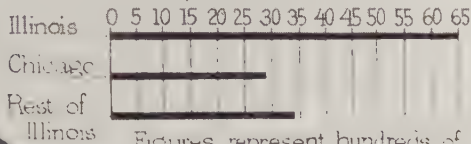
The average rainfall for the state is about thirty-eight inches, that of the south being forty-three inches and that of the north about ten inches less.

Agriculture. With remarkably fertile soil, plenty of water, and a surface flat and easily tilled, Illinois is particularly well fitted for agriculture, and no state in the Union except Iowa surpasses it in the value of its farm property. Over eighty-five per cent of its area is included in farms, and of the farm land, over eighty-eight per cent is improved. Illinois has been one of the foremost states in the introduction of improved methods of tillage, especially in the use of machinery, for which its level surface well fits it.

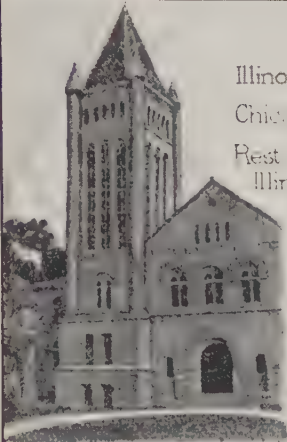
Illinois has long held high rank among the agricultural states, only Texas and Iowa exceeding it as regards crop value. As a corn

ILLINOIS

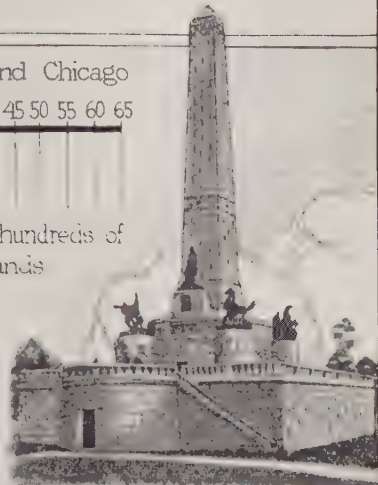
Population of Illinois and Chicago



Figures represent hundreds of thousands

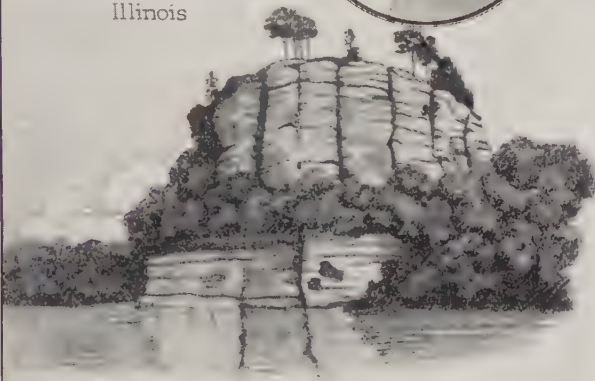
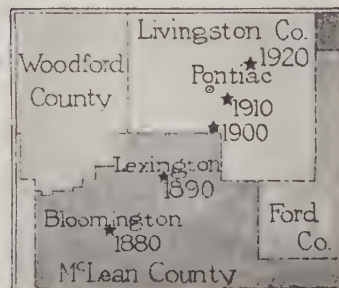


Library, University of Illinois



Lincoln's Monument, Springfield

Center of population

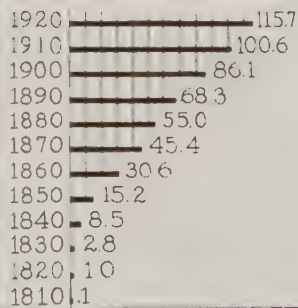


Starved Rock Illinois River

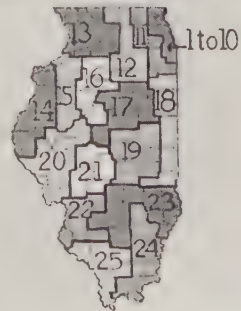


Value of farmlands

Value of farmlands
 \$10 to \$50 per acre
 \$50 to \$125 per acre
 \$125 and over



People per square mile, by decades



Congressional Districts

state, only Iowa surpasses it. Over 9,000,000 acres are devoted to this crop, and over 300,000,000 bushels is the usual annual yield. The southern and central portions of the state are in the Corn Belt. Oats, the second crop of the state in acreage and in value, are produced in greater quantity only in Iowa and Minnesota. Illinois is no longer, as it was for over a quarter of a century, the largest producer of wheat, the great Western states having left it far behind. Despite this fact, the wheat crop averages over 35,000,000 bushels a year, produced chiefly in the southwestern part of the state. Hay, potatoes, barley, rye, and buckwheat are important products, and in the extreme southern counties, designated as "Little Egypt," some tobacco is raised. Orchard fruits, especially apples; grapes, to the cultivation of which certain parts of the state are particularly well adapted; and small fruits, of which the most important is the strawberry, are also grown. In the neighborhood of Chicago there are great truck gardens, and early dawn sees on the roads leading to the city a long procession of trucks carrying fresh vegetables to the produce markets and the millions of city dwellers.

Good grazing land, and plenty of hay and corn—these are the factors which have made of Illinois an important stock-raising state. Only Iowa competes with it in the number of horses and of hogs, and it is one of the chief dairying states of the country. It is in the northern part of the state, which is devoted to cereal and forage crops and within easy reach of Chicago, that the dairy industry has grown to large proportions.

Fisheries. Illinois has a varied yield of fish, not, as might be supposed, from Lake Michigan, but chiefly from its many rivers. About a third of the fish marketed from the Mississippi Valley are from Illinois. Bass, pike, and catfish are among the important fish.

Mining. No other one mineral makes possible such industrial development as does coal, and of this valuable product, Illinois has a large supply, only Pennsylvania and West Virginia producing more. Coal beds underlie three-fourths of the area of the state, their area being estimated at 42,900 square miles, the largest in any state. Of the 102 counties, one-half have mines. More coal is produced in the southern than in the northern counties. In the production of petroleum, Illinois ranks eighth (1926); California, Oklahoma, and Texas produce about seventy-five per cent of the total output. The remarkable development of the state as an oil-producer has taken place since 1905, the output increasing within three years from a few hundred barrels to 33,000,000, then rapidly decreasing to a yield of 7,856,000 barrels in 1925. Natural gas is found in the same localities.

In addition, excellent tile and brick clay is found in large quantities, fluor spar to a greater extent than in any other state, and lead, silver, and zinc in small quantities. Illinois leads in the production of glass, sand and usually ranks sixth in cement production. All in all, this state, which at first thought one would scarcely classify among the chief mineral-producing states, in 1925 ranked seventh among all the states in that respect.

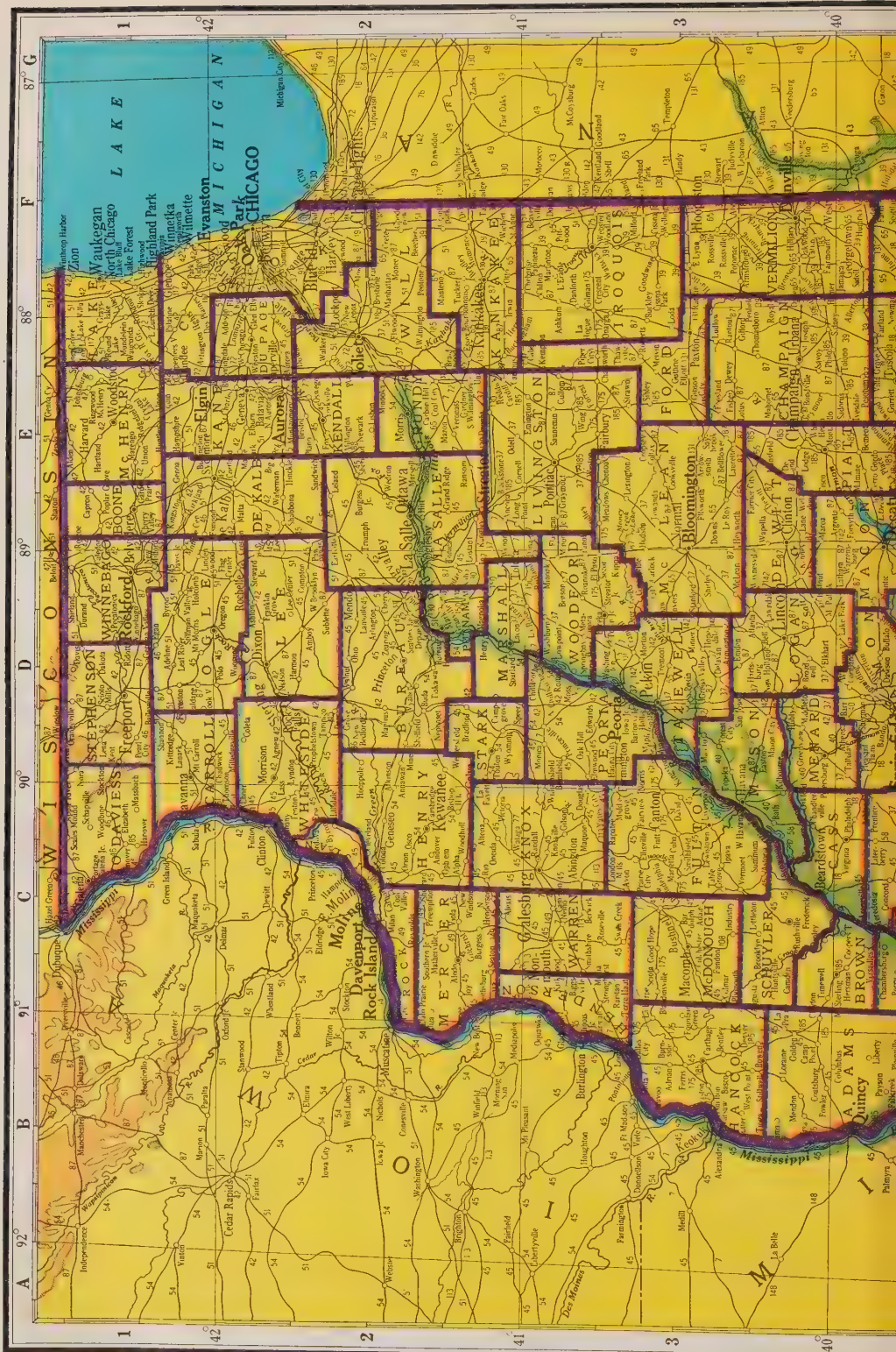
Manufactures. Illinois showed a remarkable development of manufacturing industry in the latter half of the nineteenth century. Its coal, its excellent river and lake transportation, and its rapidly spreading railroads accounted for this in large measure, and this in its turn accounted for the increase in the number of cities and large towns. Only New York and Pennsylvania now excel Illinois in manufactures. The industrial interests of Illinois now far exceed the agricultural. The greater proportion of the state's manufactures are located in Chicago. In value of manufactured product and number employed, Cicero ranks second to Chicago, because of the location in that suburban "village" of the great works of the Western Electric Company, with its thousands of employees.

By all means the most important single industry is slaughtering and meat-packing, in which Illinois leads all the states; this industry is centered in Chicago, which is the greatest packing center in the world. Next in value is the printing and publishing of books and newspapers, of which the annual output is worth almost half that of the meat-packing and slaughtering industry. The manufacture of iron and steel, of foundry and machine-shop products, and of electrical machinery and supplies rank next in value, in the order named. Among the first dozen or so in Illinois' long list of manufactures, the next most important are clothing, bread and bakery goods, railroad cars, furniture, agricultural implements, and corn products. The repair and construction of cars in railroad repair shops employs a great number of men, and petroleum-refining is included in this group of foremost industries. Illinois ranks second to New York as a manufacturer of furniture.

Transportation. Illinois exceeds all other states except Texas in its railway mileage. Its main lines aggregate about 12,000 miles. The problem of building railroads has been comparatively simple; there have been no deep, sheer valleys to bridge, no mountains to tunnel through, or elevated passes to cross—only comparatively level ground, which has not seriously taxed the energy and ingenuity of engineers. Chicago is the greatest railway center in the world, nearly all of the nation's great trunk lines meeting at that city. There are, in addition to these, other great trunk lines

ILLINOIS

Abingdon, (C3)...	2,721	Breese, (D5).....	2,399	Crainville, (D6)....	557	Fairview, (C3)....	572	Highland, (D5)...	2,902
Addison, (E2)....	510	Brightport, (F5)...	2,229	Creal Springs, (E6)	1,002	Farina, (E5).....	701	Highland Park,	
Albany, (C2).....	491	Brighton, (C4)....	586	Crescent City, (F3)	310	Farmer City, (E3),	1,678	(F1).....	6,167
Albion, (E5).....	1,584	Brimfield, (D3)....	617	Creston, (E2)....	327	Farmersville, (D4)	513	Highwood, (F1)...	1,446
Aledo, (C2).....	2,231	Bristol, (E2).....	415	Crete, (F2).....	945	Farmington, (D3),	2,631	Hillsboro, (D4)...	5,074
Alexis, (C2).....	830	Broadlands, (F4)...	384	Crossville, (E5)...	558	Fillmore, (D4)....	511	Hillside, (F2)....	555
Algonquin, (E1)...	693	Broadview, (F2)...	400	Crystal Lake, (E1)	2,249	Findlay, (E4)....	882	Hillview, (C4)...	577
Alhambra, (D5)...	354	Brocton, (F4)....	562	Cuba, (C3).....	1,484	Fisher, (E4).....	747	Hinckley, (E2)...	665
Allendale, (F5)...	451	Brookfield, (F2)...	3,589	Cullom, (E3)....	631	Fithian, (F3)....	482	Hindsboro, (E4)...	463
Allerton, (E4)....	371	Brooklyn, (C3)...	1,685	Cutler, (D5)....	631	Flanagan, (E3)...	637	Hinsdale, (E2)...	4,042
Alma, (E6).....	366	Brookport, (E6)...	1,098	Cypress, (D6)....	638	Flat Rock, (F5)...	745	Homer, (F3)....	978
Altamont, (E4)...	1,352	Brown, (E6).....	506	Dahlgren, (E5)...	493	Flora, (E5).....	3,558	Homewood, (F2)...	1,389
Alton, (C5).....	24,682	Browning, (C3)...	456	Dallas City, (B3),	1,140	Fordey, (D6)....	463	Hoopeston, (F3)...	5,451
Altona, (C2)....	506	Browns, (E5)....	388	Daltan City, (E4)	446	Forest City, (D3),	314	Hoopole, (D2)...	381
Alto Pass, (D6)...	500	Brownstown, (D4),	518	Dalzell, (D2)....	903	Forest Park, (F2),	10,768	Hopedale, (D3)...	556
Alvin, (F3).....	386	Bryant, (C3)....	482	Danforth, (F3)...	398	Forrest, (E3)....	965	Hoyleton, (D5)...	527
Amboy, (D2)....	1,944	Buckley, (F3)....	461	Danvers, (D3)....	616	Forreston, (D1)...	884	Hudson, (E3)....	309
Anna, (D6).....	3,019	Buckner, (D5)...	1,827	Danville, (F3)...	33,776	Fox Lake, (E1)...	467	Hull, (B4).....	648
Annawan, (D2)...	429	Buda, (D2).....	796	Davis, (D1).....	337	Frankfort, (F2)...	497	Humboldt, (E4)...	343
Antioch, (E1)....	775	Buffalo, (D4)....	475	Dawson, (D4)....	602	Frankfort Heights,		Hume, (F4).....	609
Apple River, (C1),	484	Bulpitt, (D4)....	470	Deer Creek, (D3)...	344	(E6).....	3,423	Humphreys, (D4)...	913
Arcola, (E4)....	1,831	Bunker Hill, (C4),	977	Deerfield, (F1)...	610	Franklin, (C4)....	611	Huntley, (E1)...	720
Area, (E1).....	420	Bureau, (D2)....	682	DeKalb, (E2)....	7,871	Franklin Grove,		Hurst, (D6)....	1,222
Arenzville, (C4),	479	Burnham, (F2)...	795	De Land, (E3)....	542	(D2).....	589	Hutsonville, (F4)...	665
Argenta, (E3)...	528	Burr Oak, (F2)...	1,237	Decatur, (E4)...	43,818	Franklin Park, (F2)	914	Illioopolis, (D4)...	814
Argenta Heights,		Bush, (D6).....	962	Delavan, (D3)...	1,191	Freeburg, (D5)...	1,594	Ina, (E5).....	398
(E1).....	2,250	Bushnell, (C3)...	2,716	Depue, (D2)....	2,428	Freeman, (E6)...	325	Indiana, (F3)...	359
Armington, (D3),	368	Byron, (D1).....	855	De Soto, (D6)....	703	Freeport, (D1)...	19,669	Industry, (C4)...	604
Aroma Park, (F2),	266	Cairo, (D6).....	15,203	Des Plaines, (F1),	3,451	Fulton, (C2)....	2,445	Ipava, (C3)....	720
Arrowsmith, (E3),	344	Camargo, (E4)...	336	Dieterich, (E4)...	522	Galatia, (E6)....	863	Irving, (D4)....	519
Arthur, (E4)....	998	Cambridge, (C2),	1,335	Divernon, (D4)...	2,382	Galena, (C1)....	4,742	Itasca, (E2)....	339
Ashkum, (E3)....	375	Campbell Hill, (D6)	366	Dixon, (D2)....	8,191	Galesburg, (C3),	23,834	Iuka, (E5).....	435
Ashland, (C4)...	1,122	Camp Point, (B3),	994	Dolton, (F2)....	2,076	Galva, (D2)....	2,974	Ivesdale, (E4)...	390
Ashley, (D5)....	751	Canton, (C3)....	10,928	Dongola, (D6)...	660	Gardner, (E2)...	937	Jacksonville, (C4)	15,713
Ashmore, (E4)...	548	Capron, (E1)....	550	Donnellson, (D4),	403	Gaskins City, (E6)	834	Jeffersonville, (E5)	322
Ashton, (D2)....	882	Carbon Cliff, (C2),	400	Donovan, (F3)...	410	Genseo, (C2)....	3,375	Jeisyville, (D4)...	428
Assumption, (D4),	1,852	Carbondale, (D6),	6,267	Dorrisville, (E6),	1,740	Geneva, (E2)....	2,803	Jerseyville, (C4),	8,839
Astoria, (C3)....	1,340	Carlinville, (D4),	5,212	Dowell, (D6)...	422	Genoa, (E1)....	1,228	Johnston City, (E6)	7,137
Athens, (D4)...	1,241	Carlyle, (D5)...	2,027	Downers Grove,		Georgetown, (F4)	3,061	Joliet, (E2)....	38,442
Atkinson, (D2)...	778	Carmi, (E5)....	2,667	(E2).....	3,543	Germantown, (D5)	766	Jonesboro, (D6)...	1,090
Atlanta, (D3)...	1,173	Carpentersville,		Dubois, (D5)....	443	Gibson City, (E3),	2,234	Joppa, (E6)....	651
Atwood, (E4)...	883	(E1).....	1,036	Dupo, (C5)....	1,393	Gillespie, (D4)...	4,063	Joy, (C2)....	529
Auburn, (D4)...	2,660	Carriers Mills, (E6)	2,343	Duquoin, (D5)...	7,285	Gilman, (F3)....	1,448	Junction, (E6)...	321
Augusta, (C3)...	1,085	Carrollton, (C4),	2,020	Durand, (D1)...	549	Girard, (D4)....	2,387	Junction City, (D5)	457
Aurora, (E2)...	36,397	Cartersville, (D6)	3,404	Dwight, (E2)...	2,255	Gladstone, (B3),	450	Kampsville, (C4)...	428
Ava, (D6).....	626	Carthage, (B3)...	2,129	Eagleville, (D4)...	378	Glasford, (D3)...	645	Kane, (C4)....	473
Averyville, (D3)...	3,815	Cary, (E1).....	463	Earlville, (D2)...	1,012	Glen Carbon, (C5),	1,323	Kankakee, (E2)...	16,753
Avon, (C3)....	877	Cary, (F4)....	2,189	East Alton, (C5),	1,669	Glencoe, (F1)...	3,381	Kansas, (E4)...	944
Baldwin, (D5)...	353	Caseville, (D5)...	675	East Carondelet,		Glen Ellyn, (E2),	2,851	Karnak, (D6)...	613
Bardolph, (C3)...	352	Cadlin, (F3)....	931	(C5).....	311	Glenview, (F1)...	760	Keensburg, (F5)...	354
Barrington, (E1),	1,743	Cave in Rock, (E6)	349	East Dubuque,		Glenwood, (F2)...	738	Keithsburg, (F2),	1,148
Barry, (B4)....	1,490	Cedar Point, (D2),	686	(C1).....	1,163	Golconda, (E6),	1,242	Kenilworth, (F1),	1,188
Bartlett, (E2)...	371	Centralia, (D5)...	12,491	East Dundee, (E1)	1,303	Golden, (B3)....	654	Kenney, (D3)...	504
Bartonsville, (D3),	1,588	Cerro Gordo, (E4),	1,003	East Hazel Crest,		Good Hope, (C3),	353	Kewanee, (C2)...	16,026
Batavia, (E2)...	4,395	Chadwick, (D2)...	582	(F2).....	394	Goreville, (D6)...	581	Keyesport, (D5)...	544
Bath, (C3)....	408	Champaign, (E3),	15,873	East Moline, (C2),	8,675	Grafton, (C5)...	949	Keysbourne, (D3)...	393
Baylis, (C4)....	388	Chandlerville, (C3)	909	Easton, (D3)....	456	Grand Ridge, (E2),	389	Kincaid, (D4)...	1,453
Beardstown, (C3),	7,111	Chapin, (C4)....	565	East Peoria, (D3),	2,214	Grand Tower, (D6)	750	Kinderhook, (B4),	332
Beavertown, (F3),	402	Charleston, (E4),	6,615	East Saint Louis,		Granite City, (C5)	14,757	Kingston Mines,	
Beckemeyer, (D5),	1,153	Chatham, (D4)...	848	(C5).....	66,767	Grantpark, (F2)...	459	(D3).....	360
Beecher, (F2)...	609	Chatsworth, (E3),	1,087	East Wenona, (E2)	333	Grainville, (D2)...	1,427	Kinmundy, (E5)...	898
Beecher City, (E4)	328	Chenabese, (F3)...	541	Edgewood, (E5)...	438	Grayslake, (F1)...	736	Kirkland, (F1)...	599
Belgium, (F3)...	489	Chenoa, (C3)...	1,311	Edinburg, (D4)...	823	Grayville, (E5)...	1,749	Kirkwood, (C3)...	882
Belknap, (E6)...	424	Cherry, (D2)....	1,267	Edwardsville, (D5)	5,336	Greenfield, (C4),	1,149	Knoxville, (C3)...	1,708
Belle River, (E5)...	311	Cherry Valley, (E1)	480	Effingham, (E4)...	4,021	Greenup, (E4)...	1,230	La Grange, (F2)...	6,525
Bellevue, (D5)...	24,823	Chester, (D6)...	2,901	Eileen, (E2)....	342	Green Valley, (D3)	446	La Grange Park,	
Bellewood, (F2)...	1,881	Chesterfield, (C4),	363	Elburn, (E2)....	571	Greenview, (D3)...	755	(F2).....	1,684
Bellflower, (E3),	441	Chicago, (F2)...	2,701,705	Eldorado, (E6)...	5,004	Greenville, (D5),	3,091	La Harpe, (C3)...	1,323
Bellmont, (F5)...	464	Chicago Heights,		Elgin, (E1)....	27,454	Gridley, (E3)...	720	Lake Bluff, (F1)...	819
Belvidere, (E1),	7,804	(F2).....	19,653	Elizabeth, (C1)...	687	Griggsville, (C4),	1,343	Lake Forest, (F1),	3,657
Bement, (E4)...	1,663	Chillicothe, (D3)...	1,986	Elizabethtown,		Hamburg, (C4)...	352	Lake Villa, (E1)...	407
Benld, (D4)....	3,316	Chrisman, (F4)...	1,101	(E6).....	1,055	Hamilton, (B3)...	1,698	Lake Zurich, (E1),	316
Bensenville, (F1),	650	Christopher, (D6),	3,830	Elkhart, (D3)....	457	Hammond, (E4)...	459	La Moille, (D2)...	547
Benson, (D3)...	414	Cicero, (F2)....	44,995	Elkville, (D6)...	990	Hampshire, (F1),	618	Lanark, (D1)...	1,297
Benton, (E5)...	7,201	Cisco, (E3)....	345	Elliot, (E3)....	344	Hampton, (C2)...	460	Lansing, (F2)...	1,409
Berwyn, (F2)...	14,150	Cisne, (E5)....	526	Elmhurst, (F2)...	4,594	Hanaford, (E6)...	1,083	La Salle, (E2)...	13,050
Bethalto, (D5)...	842	Cissna Park, (F3),	670	Elmwood, (D3)...	1,242	Hanna City, (D3),	975	Latham, (D4)...	444
Bethany, (E4)...	549	Clay City, (E5)...	648	Elmwood Park,		Hanover, (C1)...	737	Lawrenceville, (F5)	5,080
Beulah Heights, (E6)	549	Clayton, (C3)...	1,038	(F2).....	1,380	Hardin, (C4)....	694	Leaf River, (D1)...	388
Biggsville, (C3)...	425	Clifton, (F3)....	638	El Paso, (D3)...	1,638	Harrisburg, (E6),	7,125	Lebanon, (D5)...	1,883
Blandinsville, (C3)	1,002	Clinton, (E3)...	5,898	Emden, (D3)....	462	Hartsburg, (D3)...	332	Ledford, (E6)...	673
Bloomington, (E2)	448	Coalt City, (E2)...	1,741	Enfield, (E5)...	929	Harvard, (E1)...	3,294	Leland, (E2)...	588
Bloomington, (E3)	28,725	Coalton, (D4)...	994	Equality, (E6)...	1,332	Harvel, (D4)....	351	Lemont, (F2)...	2,322
Blue Island, (F2),	11,424	Cobden, (D6)....	944	Erie, (C2).....	957	Harvey, (F2)....	9,216	Lena, (D1)....	1,149
Blue Mound, (D4)	881	Coffeen, (D4)...	945	Eureka, (D3)...	1,559	Havana, (D3)...	3,614	Lenzburg, (D5)...	502
Bluffs, (C4)....	1,009	Colchester, (C3)...	1,387	Evanston, (F1)...	37,234	Hazel Crest, (F2),	438	Lerna, (E4)....	366
Bolton, (E6)....	456	Colfax, (E3)....	976	Evansville, (C5)...	575	Hebron, (E1)....	631	Le Roy, (E3)....	1,680
Bone Gap, (F5)...	455	Collinsville, (D5),	9,753	Evergreen Park, (F2)	705	Hennepin, (D2)...	377	Lewistown, (C3)...	2,279
Bourbonnais, (F2),	620	Colt, (D6)....	584	Ewing, (E5)....	341	Henning, (F3)...	347	Lexington, (E3)...	1,301
Bowen, (B3)....	715	Columbia, (C5)...	1,592	Fairbury, (E3)...	2,532	Henry, (D2)....	1,637	Libertyville, (F1),	2,125
Bradford, (D2)...	915	Concord, (C4)...	318	Fairfield, (E5)...	2,754	Herrick, (D4)...	601	Lincoln, (D3)...	11,882
Bradley, (F2)...	2,128	Cornell, (E7)...	528	Fairmont City,		Herrin, (D6)....	10,986	Litchfield, (D4)...	6,215
Braidwood, (E2)...	1,297	Coulterville, (D5),	1,407	(C5).....	1,056	Herschler, (E2)...	449	Little York, (C3)...	355
		Cowden, (E4)....	711	Fairmount, (F3)...	870	Heyworth, (E5)...	851	Livingston, (D5),	1,365



ILLINOIS

SCALE OF MILES



State Capitals ● County Seats ○
 Railroads not in operation ---
 Canals ---

All railroads are numbered as per accompanying list, making possible quick and accurate identification of each line.

RAILROADS

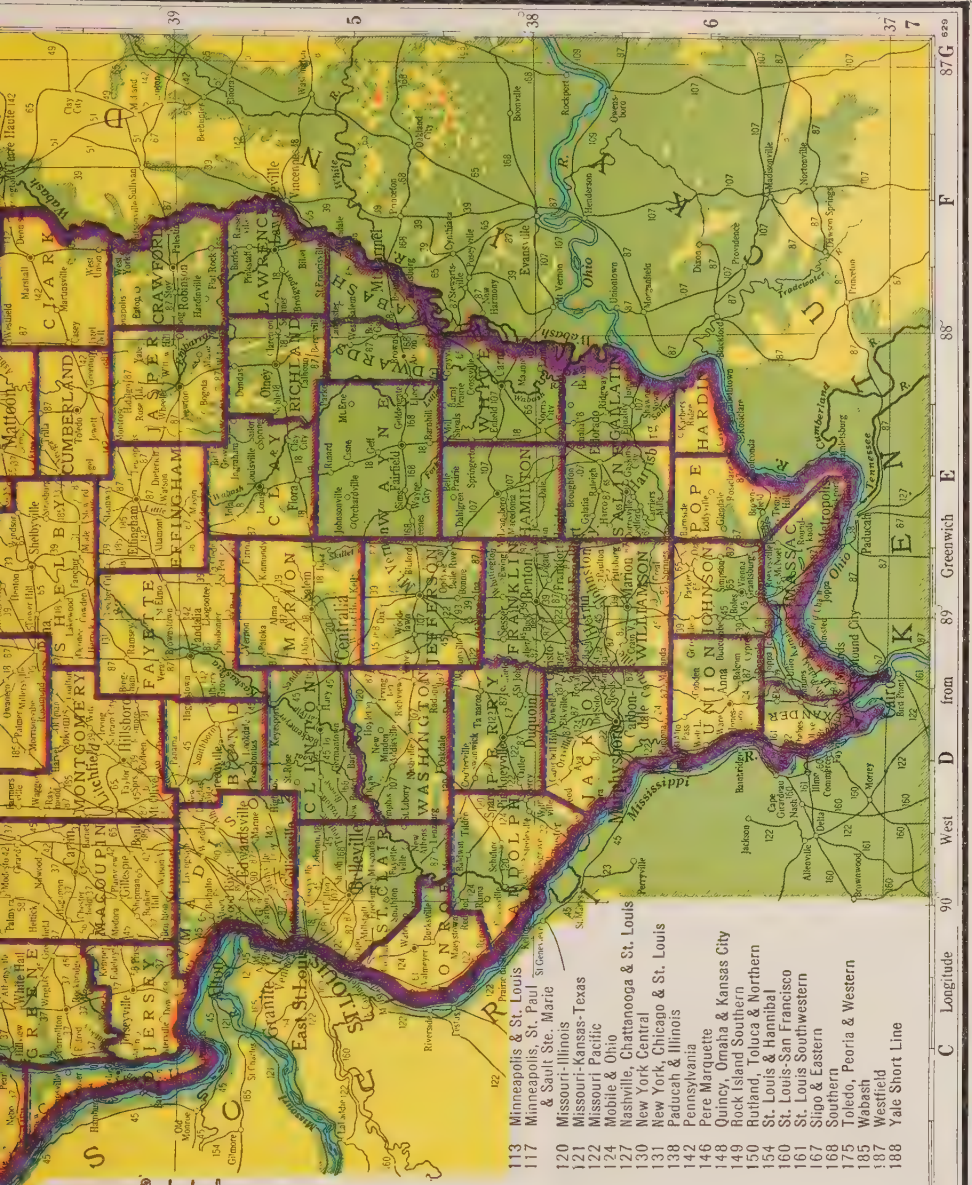
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|-----|--|-----|--|
| 2 | Alton & Eastern | 113 | Minneapolis & St. Louis |
| 7 | Atchison, Topeka & Santa Fe | 117 | Minneapolis, St. Paul & Sault Ste. Marie |
| 18 | Baltimore & Ohio Chicago Terminal | 120 | Missouri-Kansas-Texas |
| 23 | Cape Girardeau Northern | 121 | Missouri Pacific |
| 36 | Chesapeake & Ohio | 122 | Mobile & Ohio |
| 37 | Chicago & Alton | 124 | Nashville, Chattanooga & St. Louis |
| 39 | Chicago & Eastern Illinois | 127 | New York Central |
| 40 | Chicago & Illinois Midland | 130 | Paducah & Illinois |
| 42 | Chicago & North Western | 131 | Pere Marquette |
| 43 | Chicago, Attica & Southern | 138 | Quincy, Omaha & Kansas City |
| 45 | Chicago, Burlington & Quincy | 142 | Rock Island Southern |
| 46 | Chicago Great Western | 149 | Rutland, Toluca & Hannibal |
| 49 | Chicago, Indianapolis & Louisville | 150 | St. Louis & Hannibal |
| 51 | Chicago, Milwaukee, St. Paul & Pacific | 154 | St. Louis-San Francisco |
| 54 | Chicago, Rock Island & Pacific | 160 | St. Louis Southwestern |
| 58 | Chicago, Springfield & St. Louis | 161 | Sigo & Eastern |
| 65 | Cleveland, Cincinnati, Chicago & St. Louis | 168 | Southern |
| 72 | Elgin, Joliet & Eastern | 175 | Toledo, Peoria & Western |
| 76 | Galesburg & Great Eastern | 187 | Wabash |
| 77 | Grand Trunk Railway System | 188 | Yale Short Line |
| 84 | Hanover | | |
| 85 | Hoople, Yorktown & Tampico | | |
| 86 | Illinois Central | | |
| 87 | Illinois Midland | | |
| 88 | Illinois Terminal R. System | | |
| 90 | Indiana Harbor Belt | | |
| 91 | Jefferson Southwestern | | |
| 93 | Kansas & Sidel | | |
| 95 | La Salle & Bureau County | | |
| 97 | Litchfield & Madison | | |
| 98 | Louisville & Nashville | | |
| 107 | Macomb, Industry & Littleton | | |
| 108 | Michigan Central | | |
| 112 | | | |

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How to Read a Map: See page xvi, facing text page 1.



ILLINOIS *Continued*

Loami, (D4).....	462	Mount Morris, (D1) 1,250	Pawnee, (D4).....	1,200	Sandwich, (E2).....	2,409	Troy, (D5).....	1,312
Lockport, (F2).....	2,684	Mount Olive, (D4) 3,503	Paw Paw, (D2)...	665	San Jose, (D3)....	566	Tuscola, (E4).....	2,564
Loda, (E3).....	530	Mount Prospect, (F1) 349	Paxton, (E3).....	3,033	Saunemin, (E3)....	360	Ulin, (D6).....	652
Lombard, (E2)....	1,331	Mount Pulaski, (D3).....	Payson, (B4).....	453	Savanna, (C1)....	5,237	Union, (E1).....	399
London Mills, (C3)	546	 1,510	Pearl, (C4).....	669	Sawyer, (D4).....	588	Urbana, (E3)....	10,244
Loraine, (B3).....	527	Mount Sterling, (C4).....	Pearl City, (D1)...	468	Saybrook, (E3)....	752	Valer, (D5).....	876
Lostant, (E2).....	911	 1,932	Pecatonica, (D1)...	1,088	Scales Mound, (C1)	356	Valmeyer, (C5)....	406
Louisville, (E5)...	797	Mount Vernon, (E5).....	Pekin, (D3).....	12,086	Schiller Park, (F2)	390	Vandalia, (L5)...	3,316
Lovington, (E4)...	1,479	 9,815	Peoria, (D3).....	76,121	Schram City, (D4)...	1,200	Varna, (D2).....	359
Ludlow, (E3).....	343	Mount Zion, (E4)...	Peoria Heights, (D3).....	1,111	Seatonville, (D2)...	534	Venice, (C5).....	3,895
Lyndon, (D2).....	325	Moweaqua, (E4)...	Peotone, (F2).....	1,090	Secor, (D3).....	311	Vergennes, (D6)...	305
Lyons, (F2).....	2,564	Muddy, (E6).....	Percy, (D5).....	1,280	Sesser, (D5).....	2,841	Vermilion, (F4)...	318
McHenry, (E1)....	1,146	Mulberry Grove, (D5).....	Perry, (C4).....	491	Shabbona, (E2)...	735	Vermont, (C3)...	1,078
McLean, (D3).....	697	 725	Peru, (D2).....	8,869	Shannon, (D1)...	636	Versailles, (C4)...	627
McLeansboro, (E5)	1,927	Murphysboro, (D6).....	Pesotum, (E4)....	478	Shawneetown, (E6)	1,368	Victoria, (C2)...	415
Mackinaw, (D3)...	828	 10,703	Petersburg, (D3)...	2,432	Sheffield, (D2)...	996	Vienna, (E6).....	907
Macomb, (C3)....	6,714	Murrayville, (C4)...	Philo, (E3).....	544	Shelbyville, (E4)...	3,568	Villagrove, (E4)...	2,493
Macon, (E4).....	788	Nameoki, (C5)....	Pinckneyville, (D5)	2,649	Sheldon, (F3)....	1,182	Villa Park, (E2)...	854
Madison, (C5)....	4,996	Naperville, (E2)...	Phoenix, (F2)....	1,933	Sheridan, (E2)....	476	Viola, (C2).....	668
Magnolia, (D2)...	321	Naples, (C4).....	Pinckneyville, (D5)	2,649	Shermerville, (F2)...	554	Virden, (D4).....	4,682
Mahomet, (E3)...	649	Nashville, (D5)...	Piper City, (E3)...	715	Sherrard, (C2)....	437	Virginia, (C4)...	1,501
Makanda, (D6)...	310	National City, (C5)	Pittsburg, (E6)...	670	Shiloh, (D5).....	381	Waggoner, (D4)...	307
Malta, (E2).....	391	Nauvoo, (B3)....	Pittsfield, (C2)...	2,129	Shipman, (C4)....	333	Walnut, (D2).....	771
Manchester, (C4)...	456	Nebo, (C4).....	Plainfield, (E2)...	1,147	Sibley, (E3).....	383	Waltonville, (D5)	421
Manhattan, (F2)...	525	Neoga, (E4).....	Plano, (E2).....	1,473	Sidell, (F4).....	800	Wamac, (D5).....	1,180
Manito, (D3).....	758	Neponset, (D2)...	Pleasant Hill, (C4)	433	Sidney, (E3).....	546	Wapella, (E3)...	528
Manlius, (D2)...	309	Newark, (E2)....	Pleasant Plains, (D4).....	1,078	Silvis, (C2).....	2,541	Warren, (D1)....	1,253
Mansfield, (E3)...	669	New Athens, (D5)...	Plymouth, (C3)...	900	Sims, (E5).....	429	Warrensburg, (D4)	490
Mantero, (F2)....	1,182	New Baden, (D5)...	Pocahontas, (D5)...	830	Smithfield, (C3)...	385	Warsaw, (B3)...	2,031
Maple Park, (E2)...	384	New Boston, (C2)...	Polo, (D2).....	1,867	Smithton, (C5)...	357	Washington, (D3)	830
Maquon, (C3)....	441	New Berlin, (D4)...	Pontiac, (E3)....	6,664	Somona, (E2)....	540	Washington, (D3)	1,643
Marengo, (E1)....	1,758	New Canton, (B4)...	Poplar Grove, (E1)	316	Sorento, (D4)....	942	Washington Park, (C5).....	1,516
Marietta, (C3)...	512	New Douglas, (D5)	Port Byron, (C2)...	510	South Beloit, (E1)	1,436	Wataga, (C2)....	459
Marine, (D5).....	676	New Grand Chain, (D6).....	Posen, (F2).....	947	South Elgin, (E2)...	559	Waterloo, (C5)...	1,930
Marion, (E6)....	9,582	 397	Prairie City, (C3)...	638	South Holland, (F2)	1,247	Waterman, (E2)...	401
Marissa, (D5)....	1,900	New Haven, (E6)...	Prairie du Rocher, (C5).....	535	South Jacksonville, (C4).....	435	Watseka, (F3)...	2,817
Mark, (D2).....	1,300	New Holland, (D3)	Princeton, (D2)...	4,126	South Pekin, (D3)...	944	Watson, (E4)....	316
Maroa, (E3).....	1,193	Newman, (E4)....	Princeville, (D3)...	1,035	South Wilmington, (E2).....	1,362	Wauconda, (E1)...	399
Marshall, (F4)...	2,222	Newton, (E5)....	Prophetstown, (D2)	1,159	Sparta, (D5).....	3,340	Wayne City, (E5)...	561
Martinsville, (F4)	1,437	Niantic, (D4)....	Plush, (D6).....	518	Springerton, (E5)...	318	Waynesville, (D3)	592
Martinton, (F3)...	250	Niles, (F1).....	Quincy, (B4)....	35,978	SPRINGFIELD, (D4).....	59,183	Wellington, (F3)...	288
Maryville, (D5)...	836	Niles Center, (F1)...	Ramsey, (D4)....	772	Spring Grove, (E1)	363	Wenona, (E2)....	1,203
Mascoutah, (D5)...	2,343	Noble, (E4)....	Rankin, (F3)....	944	Spring Valley, (D2)	6,493	Wenonah, (D4)...	299
Mason, (E5).....	321	Nokomis, (D4)...	Ransom, (E2)....	402	Standard, (D2)...	980	West Chicago, (E2)	2,594
Mason City, (D3)...	1,880	Normal, (E3)....	Rantoul, (E3)....	1,551	Stanford, (D3)...	500	West City, (E5)...	525
Matherville, (C2)...	886	Norris, (D3)....	Raymond, (D2)...	868	Staunton, (D4)...	6,027	West Dundee, (E1)	1,587
Mattoon, (F2)....	485	Norris City, (E6)...	Red Bud, (C5)...	1,141	Steeleville, (D5)...	702	Western Springs, (F2).....	1,258
Mattoon, (E4)....	13,552	North Aurora, (E2)	Reeves, (D6)...	779	Steger, (F2).....	2,304	Westfield, (F4)...	933
Maun, (E5).....	480	North Chicago, (F1).....	Reynolds, (C2)...	322	Sterling, (D2)....	8,182	West Frankfort, (E6).....	8,478
Maywood, (F2)....	12,072	 5,839	Richmond, (E1)...	533	Stewardson, (E4)...	731	West Hammond, (F2).....	7,492
Mazon, (E2).....	442	North Chillicothe, (D3).....	Richview, (D5)...	330	Stickney, (F2)....	550	West Point, (B3)...	303
Mechanicburg, (D4)	470	 1,002	Ridge Farm, (F4)...	851	Stillman Valley, (D1)	313	West Salem, (F5)...	946
Medora, (C4)....	483	North City, (D5)...	Ridgway, (E6)...	1,102	Stonington, (D4)...	1,449	Westview, (F3)...	4,241
Melrose Park, (F2)	7,147	 1,362	Riverdale, (F2)...	1,166	Stockton, (D1)....	1,449	Wheaton, (E2)....	4,137
Melvin, (E3).....	540	North Henderson, (C2).....	River Forest, (F2)	4,358	Stonington, (D4)...	1,466	Wheeling, (F1)...	313
Mendon, (B3)....	645	 500	River Grove, (F2)...	484	Strasburg, (E4)...	469	Whiteash, (E6)...	381
Mendota, (D2)...	3,934	North Utica, (E2)...	Riverside, (F2)...	2,532	Streator, (E2)....	14,779	White City, (D4)...	503
Meredosia, (C4)...	810	Oakford, (C3)....	Riverton, (F2)...	1,916	Stronghurst, (C3)...	836	White Hall, (C4)...	2,954
Meriden, (D4)....	683	Oakland, (E4)....	Riverview, (F1)...	334	Sullivan, (E4)....	2,532	Williamsfield, (D3)	435
Metcalfe, (F4)....	509	Oaklaw, (E2)....	Roanoke, (D3)...	1,368	Summit, (F2)....	4,019	Williamsville, (D4)	652
Metropolis, (E6)...	5,055	Oak Park, (F2)...	Robbins, (F3)...	431	Sumner, (E5)....	1,029	Willisville, (D6)...	1,485
Middleton, (D3)...	587	Oakwood, (F3)...	Roberts, (E3)...	444	Swansea, (D5)...	1,048	Willow Hill, (E4)...	397
Middleton, (D3)...	587	Oblong, (F5)....	Robinson, (F5)...	3,375	Tampico, (D2)...	788	Wilmington, (E2)...	1,384
Milan, (C2).....	850	Oconomowoc, (D4)...	Rochelle, (D2)...	3,310	Taylor Springs, (D4).....	1,526	Wilsonville, (D4)...	837
Milford, (F3)....	1,466	Odell, (E2).....	Rockdale, (E2)...	1,478	Taylorville, (D4)...	5,806	Winchester, (C4)...	1,540
Milledgeville, (D2)	746	Ogden, (F3)....	Rock Falls, (D2)...	2,927	Teutopolis, (E4)...	728	Windsor, (E4)....	1,000
Millersburg, (D3)...	455	Oglesby, (E2)...	Rockford, (D1)...	65,651	Thawville, (E3)...	318	Winnebago, (D1)...	495
Mill Shoals, (E5)...	356	Ohio, (D2).....	Rock Island, (C2)	35,177	Thayer, (D4)....	1,254	Winnetka, (F1)...	6,694
Millstadt, (C5)...	907	Okawville, (D5)...	Rochester, (D4)...	399	Thebes, (D6).....	857	Winslow, (D1)...	371
Milton, (C4)....	348	O'Fallon, (D5)...	Rockdale, (E2)...	1,478	Thompsonville, (E6)	577	Wintrop Harbor, (F1).....	473
Mineral, (D2)...	308	Ogden, (F3)....	Rock Falls, (D2)...	2,927	Thomson, (C2)...	495	Witt, (D4).....	2,443
Minier, (D3)....	789	Oglesby, (E2)...	Rockford, (D1)...	65,651	Tilden, (D5)....	1,137	Woodhull, (C2)...	700
Minonk, (D3)....	2,109	Ohlstedt, (D6)...	Rock Island, (C2)	35,177	Tilton, (F3)....	909	Woodland, (F3)...	398
Minooka, (E2)....	314	Olney, (E5)....	Rockton, (D1)...	899	Tinley Park, (F2)...	493	Woodlawn, (D5)...	309
Mokena, (F2)....	475	Omaha, (E6)....	Roodhouse, (C4)...	2,928	Tiskilwa, (D2)...	915	Woodriver, (D5)...	3,476
Moline, (C2)....	30,734	Omaha, (E6)....	Roseville, (C3)...	952	Toledo, (E4).....	787	Woodstock, (E1)...	5,523
Momence, (F2)...	2,218	Onarga, (E6)...	Roscicare, (E6)...	1,522	Tolono, (E4).....	693	Worden, (D5)...	1,252
Monroe, (F2)....	395	Oquawka, (B3)...	Rossview, (F3)...	1,588	Toluca, (D2)....	2,503	Wyand, (D2)....	825
Monmouth, (C3)...	8,116	Oranville, (D1)...	Royalton, (D6)...	2,043	Tonica, (E2)....	439	Wyoming, (D2)...	1,376
Montgomery, (E2)	463	Orangeville, (D1)...	Rushville, (C3)...	2,275	Toulon, (D2)....	1,235	Xenia, (E5).....	640
Monticello, (E3)...	2,280	Oregon, (D2)...	Rutland, (D4)...	618	Towanda, (E3)....	404	Yates City, (C3)...	582
Montrose, (E4)...	334	Orient, (E6)....	Sadorus, (E4)....	413	Tower Hill, (E4)...	769	Yorkville, (E2)....	441
Morris, (E2)....	4,505	Orion, (C2)....	Sailor Springs, (E5)	284	Tremon, (D3)....	976	Zeigler, (D6)....	2,338
Morrison, (D2)...	3,000	Orland Park, (F2)...	Saint Anne, (F2)...	1,067	Trenton, (D5)....	1,200	Zion, (F1).....	5,580
Morrisville, (D4)	1,178	Osage, (E2)....	Saint Charles, (E2)	4,099				
Morton, (D3)....	1,179	Ottawa, (E2)....	Saint David, (C3)...	1,189				
Morton Grove, (F1)	1,079	Owaneco, (D4)...	Saint Elmo, (E4)...	1,337				
Mound City, (D6)...	2,756	Palatine, (E1)...	Sainte Marie, (E5)...	351				
Mounds, (D6)....	2,661	Palestine, (F4)...	Saint Francisville, (F5).....	1,164				
Mount Auburn, (D4)	492	Palmer, (D4)....	Saint Jacob, (D5)...	485				
Mount Carmel, (F5)	7,456	Palmira, (C4)....	Saint John, (D5)...	353				
Mount Carroll, (D1)	1,806	Pana, (D4).....	Saint Joseph, (E3)...	772				
Mount Greenwood, (F2).....	1,441	Panama, (D4)....	Saint Peter, (B5)...	396				
		Paris, (F4)....	Salem, (E5).....	3,457				
		Park Ridge, (F1)...	Sandoval, (D5)...	1,768				
		Patoka, (D5)....						

which cross the state farther south and enter Saint Louis. A network of electric lines totaling over 3,500 miles further increases the state's transportation facilities. Chicago, the only Illinois port of entry, is the greatest of the world's lake ports (see CHICAGO). Grain and iron ore furnish the main cargo for the many



ILLINOIS CANALS

(a) Illinois and Michigan Canal; (b) Hennepin Canal.

steamers engaged in lake trade between Chicago and other ports. In the discussion of transportation, there still remain the canals—those waterways less used to-day than formerly, but yet of some importance. The first canal problem was to connect Lake Michigan with the Illinois River, and this was accomplished in 1848 by the completion of the Illinois and Michigan Canal, which has its western end at La Salle. The Chicago Drainage Canal diverts the water of the Chicago River from Lake Michigan, its natural outlet, to the Illinois, thence to the Gulf of Mexico. In 1907 there was finished the Hennepin Canal, which connects the Illinois River with the Mississippi just below Rock Island. Until recent years, the roads of Illinois were very poor, but highway construction is now receiving marked attention. Almost 4,500 miles of hard-surfaced roads had been completed at latest report, and motorbus transportation now rivals that of the interurban electric lines.

Government and History

Government. The present constitution of Illinois, the third in its history as a state, dates from 1870. Amendments may be proposed by two-thirds of each house of the general assembly, but do not become operative until ratified by a majority of the people at a general election. Not more than one amendment may be proposed at one session of the legislature, and the same article of the constitution may not be brought up for amendment oftener than once in four years. Amendment is thus rendered difficult, with the result that for a number of years there has been a demand for a convention to frame a new constitution. In 1922 a proposed

constitution was submitted to the people, but defeated by a decisive majority.

The *executive* department of the government consists of a governor, lieutenant-governor, secretary of state, auditor of public accounts, treasurer, superintendent of public instruction, and attorney-general, all chosen by popular vote and holding office for four years, except the treasurer, who is elected for two years. He is not eligible for reelection until two years after the expiration of his term.

The *legislative* department consists of a general assembly composed of two houses, a senate and a house of representatives. The senate has fifty-one members, one elected from each of the senatorial districts into which the state is divided, the term of office being four years. Each district also returns to the lower house three representatives, chosen for two years. The manner of voting for representatives, in accordance with the principles of minority representation, is especially interesting. Each voter has three votes, and he may distribute these among three candidates, give one and one-half votes to each of two, or cast them all for one candidate for whose election he is particularly anxious. This method of "cumulative voting," as it is called, has been adopted in few states, and is in disfavor, even in Illinois, as it frequently promotes the election of undesirable officials. The sessions of the legislature are biennial, and are held in the odd-numbered years. The governor holds the



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FESTIVITIES OF EARLY FRENCH SETTLERS

usual veto power, but a two-thirds vote of both houses makes a bill operative despite the governor's veto.

At the head of the *judicial* system is the supreme court, which consists of one judge from each of the seven judicial districts into which the state is divided. Their term is nine years. No decision may be given by the court in which four of the judges do not concur. The lower judicial bodies consist of circuit courts, appellate courts, county courts, and, at

the bottom of the list, the justice courts, before which only petty cases are brought. Cook County, with its great city of Chicago, constitutes one judicial district and has its own circuit court, superior court, and special municipal courts.

History. French Period. Marquette, so far as known, was the first white man to visit the territory comprising the present Illinois. In 1673 he made his way up the Illinois River with his canoes, and six years later La Salle further explored the same river, building, near the present site of Peoria, Fort Crèvecoeur (Broken Heart). Fort Saint Louis was erected on Starved Rock, that natural vantage point above the river, in 1682, but not until 1700 was the first town in Illinois really founded. This was Kaskaskia. The Illinois Indians, for whom the state was named, were friendly, and the missions established among them met with considerable success. The whole section, which soon had many trading posts, was put under a French military commandant and made part of the territory of Louisiana.

Early National Period. The victories which in 1763 gave Canada to the English also brought into their possession this territory, but little change was made, though the English did not understand as well as the French the method of dealing with the Indians. Even this frontier region was the scene of conflicts during the Revolutionary War. In 1778 George Rogers Clark and his band of frontiersmen marched and waded their way against the unsuspecting Kaskaskia. The capture of Kaskaskia, Cahokia, and Vincennes, which made the territory part of the new nation, is one of the romances of Illinois' early history (see CLARK, GEORGE ROGERS). In 1787 Illinois became a part of the Northwest Territory (which see), and in 1809 was organized as a separate territory, with its capital at Kaskaskia. Throughout all these early years, there were constant troubles with the Indians, no longer friendly, and in 1812 occurred the famous massacre at Fort Dearborn (which see), on the site of Chicago. Before this date, the titles to most of the land had been taken from the Indians, but it was not until two decades later that the Indians finally left the territory. On December 3, 1818, Illinois, with a population of about 40,000, was admitted to the Union as the twenty-first state.

Growth Toward Prosperity. For a time the Indian troubles continued and settlement in the north could not go forward, but after the Black Hawk War in 1832 the remainder of the Indians removed across the Mississippi, and Illinois was free to develop more rapidly. Emigrants from the East and South flocked to the state, the latter with the determination to make of it slave territory, despite the direct prohibition of the Ordinance of 1787 (which

see), and not until the time of the War of Secession did the bitter struggle between the slavery and anti-slavery parties really die out. Meanwhile, economic development went on rapidly, the plow was developed to break up the rough prairie lands once used only for pasturage, and the invention of modern agricultural implements followed. Railroads were built, the Illinois and Michigan Canal was begun in 1834, and great grain crops of the new prairie lands were harvested and sent out of the state over its numerous waterways.

A sharp clash took place soon after 1840 with the Mormons, who had settled at Nauvoo and acquired considerable political power. This culminated in the assassination of Joseph



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TERRITORIAL LEGISLATIVE HALL

The first legislature of Illinois Territory met in this building in Kaskaskia. The bricks of which it was built were brought from Pittsburgh, and this was the first brick building west of that city.

Smith, the founder and leader, in 1844, and in the next year the Mormons set out on their remarkable overland trip to Utah (see **MORMONS**).

In the years before the War of Secession, Illinois attracted national attention chiefly because of the famous Lincoln-Douglas contest for the Senate, and during the war it furnished an enormous quota of troops—260,000 men in all. Illinois also is credited with furnishing the war President—Abraham Lincoln—and Ulysses S. Grant, the latter famous as a general and later as President of the Union.

Last Half Century. The industrial development of Illinois in the decades following the War of Secession was remarkable. Railroads multiplied so that their mileage was greater than that of any other state; mining advanced by rapid strides; grain was produced in ever-increasing quantities; and the "mushroom" city of Chicago acquired permanence as the largest grain and livestock market of the country. Outstanding events in earlier years largely concerned Chicago; these include the great fire of 1871; the labor troubles in 1885 and 1886, which resulted in the anarchist riot in Haymarket Square; the World's Columbian



Originals owned by Chicago Historical Society

Illinois in Early Years. Above, at left, ruins of Fort Chartres; below, the town of Nauvoo in 1840. At right, the old Mormon Temple at Nauvoo; it was destroyed in a fire of incendiary origin, in October, 1848.

QUESTIONS ON ILLINOIS

(An outline suitable for Illinois will be found with the article "State.")

How do the name of the state and that of its largest city recall the early inhabitants of the territory?

How has the state shown its progressive character in dealing with the question of crime?

For what very important products does Illinois receive all the raw material from other states?

How does the state rank as a mineral producer?

Why is it so difficult to amend the constitution? What has this unusual difficulty led to?

What is the popular name for the state? What is the state flower?

How has the location of Illinois influenced its development?

Where is Starved Rock? Describe the surrounding country.

What was the first town ever established in Illinois? Had any previous attempt at settlement been made by the white men?

Why was the southern part of the territory settled before the northern? What brought about the settlement of the northern regions?

What part of the state was described in a famous novel? How has much of the unpleasantness of the region been done away with?

Why has Illinois been able to introduce farm machinery more extensively than many of the other states?

Describe the present population of Illinois as to nationalities, distribution, and numbers.

What was the population of the state when it was admitted to the Union?

Why does not the statement that there are on an average 115.7 people to the square mile in Illinois convey a correct idea as to the density of population?

How has the course of an important river of the state been changed?

What specially important part did the chief river within the state play in its early history?

What is the chief agricultural industry in the vicinity of Chicago? What is the main crop in the state?

When did the last Indians leave the state? Was this before or after the founding of Chicago?

Which state leads all others in the manufacture of furniture?

Does Illinois manufacture much furniture?

What is the most important industry in Illinois? How does the second leading industry compare with it in value?

What lake is really not a lake?

Why has dairying been localized in the northern part of the state?

What part did a prominent religious sect play in the history of the state?

How many people out of each hundred, on the average, cannot read and write? What would be the difference if only American-born whites were considered?

What range of temperature is shown by the greatest extremes ever recorded within the state? Why are sudden changes of temperature frequent?

How does the state compare with other states as to railroad mileage? What city is the greatest railroad center of the country?

Exposition of 1893; and the railway strike of 1894, which had its center at Pullman, just outside of Chicago, and was quelled only by the action of the Federal troops.

In 1913 the legislature passed a measure giving to women partial suffrage. Their influence was most noticeable on questions concerning the liquor traffic. In 1917, fifty-three of the 102 counties of the state were under prohibition laws, besides which there existed township prohibition in many other sections. Illinois was the first state to approve the woman-suffrage amendment to the United States Constitution, and it previously gave a prompt vote favorable to the national prohibition amendment. In 1918 Illinois celebrated its one hundredth anniversary as a state.

In politics, Illinois had shown itself consistently Democratic in national politics up to the time of the War of Secession, but since that time, it has been Republican except in 1892, when it cast its vote for Cleveland, and in 1912, when Wilson was its choice. C.E.C.

Related Subjects. The reader is referred in these volumes to the following articles:

CITIES AND TOWNS

Cities and towns other than those listed here will be found on the back of the state map.

Chicago	Peoria
Decatur	Rockford
East Saint Louis	Springfield
Evanston	

HISTORY

Indians, American	Marquette, Jacques
Black Hawk	Mormons
Clark, George Rogers	Ordinance of 1787
Joliet, Louis	Starved Rock
Lincoln, Abraham	Tonty, Henri de

PRODUCTS AND INDUSTRIES

Coal	Oats
Corn	Petroleum
Dairying	Steel
Meat and Meat Packing	Wheat

RIVERS

Illinois	Rock
Mississippi	Wabash
Ohio	

UNCLASSIFIED

Chicago Drainage	Michigan, Lake
Canal	Ozark Mountains
Erie Canal	Prairie

ILLINOIS AND MICHIGAN CANAL. In the year 1822, Congress granted to the state of Illinois the right of way for the construction of a canal to connect Lake Michigan by way of the south branch of the Chicago River with the Illinois River at La Salle. After several surveys and estimates, during which Chicago and Ottawa were founded, it was begun in 1836 and finished twelve years later, at a cost of over \$6,000,000. The canal, ninety-six miles in length, has seventeen locks, each 110 feet long and eighteen feet wide, by means of which the drop of 145 feet from Lake Michigan to La Salle is accomplished. Boats of 150 tons

can easily pass through the canal, for it is six feet deep and sixty feet wide at the bottom. For a time after the construction of railways, it was little used, but recently it has been cleaned out and is employed to some extent for local freight-carrying. See CANAL, and illustration in article ILLINOIS.

ILLINOIS AND MISSISSIPPI CANAL. See HENNEPIN CANAL.

ILLINOIS INDIANS. See INDIANS, AMERICAN (Most Important Tribes).

ILLINOIS RIVER, the largest waterway of Illinois, and the most important, both from an industrial and an historic standpoint. It is formed by the union of the Des Plaines and Kankakee rivers, whose waters meet about forty-five miles southwest of Chicago. From this point the Illinois follows a diagonal course across the state, emptying into the Mississippi about fifty miles above Saint Louis. Its length is 500 miles, and it drains an area of 25,000 square miles. For long distances, the stream cuts its way through bed rock, exposing ledges of limestone and coal layers.

Vessels ascend the river as far as La Salle, 250 miles from its mouth, and at this point the Illinois and Michigan Canal (which see), ninety-six miles long, connects it with the south branch of the Chicago River. Since the opening of the Chicago Drainage Canal (which see), the average level of the river has been raised, and in times of high water, the lowlands along its banks are often submerged; several times a number of towns along its lower course have been flooded. The Illinois will be an important part of the waterway which, it is proposed, shall connect the Great Lakes with the Gulf of Mexico.

ILLITERACY, *il it' ur a sie.* There are various standards of illiteracy among the nations of the world. In the United States, the Bureau of the Census includes among illiterates all persons ten years of age or over who are unable to write in any language (not necessarily English), regardless of ability to read. This rule presumes that one who is able to write can also read. In Canada, one is illiterate who can neither read nor write.

In Europe, in the countries of Denmark, the Netherlands, Sweden, and Switzerland, there is no basis of age, but among males one is illiterate who cannot read or write when he becomes an army recruit, usually at the age of seventeen or eighteen; in the countries named there is no illiteracy standard for females. In Great Britain, males and females are officially classed as illiterate who upon marriage cannot read or write. In other European countries, reading and writing are the basis of standards, the age being variously from seven to ten years.

Elimination of Illiteracy. In the United States, the struggle for the elimination of illiteracy had its origin in the mountains of Kentucky

in September, 1911, in what is known as the "moonlight schools." These schools, taught by volunteer teachers for grown men and women who cannot read and write, were first conducted on moonlight nights, which gave them their romantic name. Later, the sessions were made continuous through several weeks, the opening week being one of moonlight, to attract a larger enrollment.

Within three years, the movement, which started in Rowan County, had extended to twenty-five other counties in the state. Then the legislature created a state Illiteracy Commission, the first of its kind in history. Alabama, Arkansas, Mississippi, South Carolina, and Georgia quickly followed and created like commissions, while North Carolina and Oklahoma began a campaign to teach their illiterates. In several other states, certain counties were selected and made demonstration points for the elimination of illiteracy.

The entrance of the United States into the World War threw new light on illiteracy conditions. It was found that 700,000 American young men in the first draft could not write their names, but had signed their registration cards by mark. This condition aroused the public, and gave a new impetus to the movement. Six years of experience in dealing with illiterates had developed some skill in methods and technique which was immediately applied to this situation. Special books for illiterate soldiers were prepared, dealing with the terms and psychology of war and camp life, and many men were put under instruction several weeks before they left home for the training camps. Thousands were taught in American training camps and overseas during the war, and in the army of occupation after the Armistice was signed.

Since the war, the movement has steadily extended, not only in the United States, but in many other countries, notably in Russia, China, Italy, Spain, Mexico, and the Central American countries. In the United States, many powerful organizations have enlisted to aid in the elimination of illiteracy. These are the American Red Cross, the American Legion, the National Education Association, the American Association of University Women, the General Federation of Women's Clubs, and the National Congress of Parents and Teachers. The United States Bureau of Education, which fostered the movement from the beginning, has added a specialist in adult education, who gives much time to illiteracy conditions and their elimination. The United States Commissioner of Education has issued statements declaring illiteracy a menace to the nation, and calling on organizations and individuals to aid in wiping it out. The Presidents of the United States, in messages to Congress and in other public addresses, have challenged the

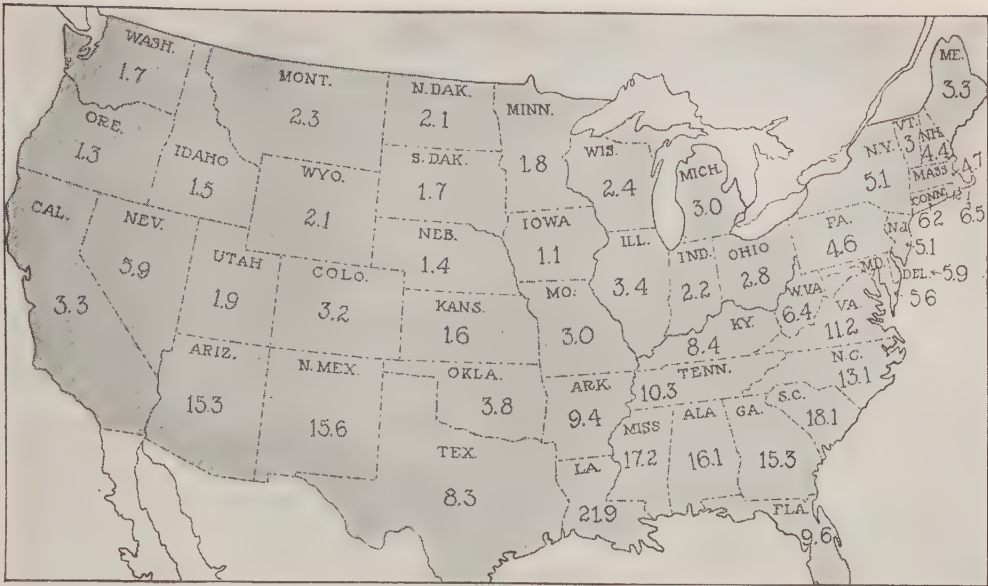
educated citizens of the nation to go to the relief of its illiterates. The governors of most of the states have issued proclamations declaring illiteracy a serious menace calling for instant remedy. They have urged state organizations and all individuals to enlist for volunteer service, and have recommended that legislatures appropriate funds. National, regional, and state illiteracy conferences have been held and are continuing to be called.

The National Illiteracy Crusade has appeared in the field as the one organization that is concentrating altogether on this problem. Organized on February 22, 1926, it established headquarters in the American Red Cross Building in Washington, D. C. This organization, composed of both laymen and educators, was created to intensify the efforts being made to eliminate illiteracy, and to coordinate the work of the various agencies to make them more powerful and effective. It attempted to focus the attention of the entire nation on illiteracy, and to bring about a more sweeping and dynamic campaign. This organization prepared to answer calls for information on illiteracy, distribute literature, furnish expert consultant service, provide books for illiterates, and supply speakers.

In some parts of the country, the movement assumes all the fervor of patriotic war-time activity, being conducted with stirring slogans and spirited campaign songs; in others, where it has been longer in progress, it has become a steady program, with regular appropriations by the state for its continuance until the last illiterate is taught. Alabama, for example, has a budget of \$100,000 annually for this purpose, \$50,000 appropriated by the state, and a like sum to be added by county and city boards of education. This will be expended mainly on illiteracy among negroes.

The elimination of illiteracy among adult Indians has been incorporated in the program of the Federal Bureau of Indian Affairs. The campaign for the elimination of illiteracy from Federal, state, and county prisons is a branch of the campaign that is popular and is making considerable headway, some of the states having made a rule that no prisoner shall be eligible for pardon or parole until he has learned to read and write.

A special system of writing has been devised to enable adults to learn to write quickly—a system of grooved or sunken letters in blotting paper, which they trace at first to get the forms of their names and of the letters of the alphabet. Special books adapted to various classes of illiterates have been prepared. This series is known as *First Books*, the term "primer" being considered childish, and, therefore, bad psychology for adults. The series includes *Country Life Reader*, *First Book*, for illiterate farmers and their wives; *Indian First*



ILLITERACY IN THE UNITED STATES

The percentages for the various states are those reported by the last decennial census.

Book; Mothers' First Book, for teaching women individually who are kept at home by little children and are unable to attend school; *My First Book*, for illiterate prisoners.

These books all have the purpose of teaching important reforms while training the student to read and write. The lessons are based on subjects related to his life and environment. The farmer, in his first lessons, reads about improved methods of farming; the mother reads of such subjects as baby care, cleanliness, and proper foods for the family. Indians begin reading lessons on the traditions of their own people, as a stimulus to their pride, the lessons leading gradually into others on the modern practices which they, as a race, should adopt. The lessons for illiterate prisoners are written with an underlying psychology of cheer and character-building, without sermonizing.

The United States Census Bureau has opened its records on illiteracy, and is furnishing names and other information to school officials in places where illiteracy is being combated. These records were closed to the public until 1914, when an exception was made and permission given to copy the record for Rowan County, Kentucky, for the purpose of checking up on the illiterates that had been taught. This precedent led to the furnishing of the names in 1915 of all illiterates listed for the state of Kentucky, to enable it to carry out this statutory mandate of the legislature to the state Illiteracy Commission:

It shall be the duty of such Commission, and it shall have the power, to make research, collect data and statistics, and procure surveys of any and all com-

munities, districts, or vicinities of the state looking to the obtaining of a more detailed, definite, and particular knowledge as to the true conditions of the state with regard to its adult illiteracy.

Then the Census Bureau began to receive calls from Alabama, Oklahoma, Arkansas, and North Carolina for similar information. New York and Pennsylvania took immediate steps after the 1920 census to secure the names of their illiterates. To-day, the Census Bureau is receiving constant calls, and is continually copying names of illiterates and supplying them as one important step in the elimination of illiteracy from a locality.

Through the press, the forum, and by other means, the public is becoming educated as to the meaning, extent, and effects of adult illiteracy. Formerly, many otherwise well-informed persons supposed illiteracy to be entirely a condition existing in some distant locality; they have now come to realize that it exists at their very doors. Sheets of illiteracy statistics by counties, cities, and villages have been freely circulated, accompanied by startling statistics which emphasized points where the community's record was conspicuously bad. The definition of illiteracy, so confused and beclouded in the minds of people generally, is becoming clear. The prevalent opinion that illiteracy existed mainly among the foreign-born has been corrected, and the fact that only 1,700,000 of the country's five million illiterates are of foreign birth is now well understood.

An increase in school attendance of from twenty to forty per cent in localities where illiteracy campaigns have flourished has been

reported by school officials; and increased sentiment for the enforcement of school-attendance laws is one of the pronounced results of this movement, as may be seen by the tendency to strengthen compulsory school laws, to prevent a recurrence of illiteracy in the future.

Several of the states are nearing their goal, which is the elimination of illiteracy completely. North Dakota, for example, during a campaign covering three years (1921-1924), reduced its illiteracy from 2.1 per cent to .07 per cent. According to the census of 1920, the greatest reduction of illiteracy was in those states where the illiteracy campaign was concentrated—the East South-Central, West South-Central, and South Atlantic States. South Carolina, which created an Illiteracy Commission in 1916, but actually organized it in 1918, reduced its illiteracy by more than one-fourth in a period of two years, as was shown by the census of 1920.

The need of eliminating illiteracy from the United States is being constantly impressed on its citizens. The rank of the country, which is tenth from the top, is being emphasized as a position undesirable for a great republic to occupy. In certain spots where illiteracy is densest, it is impossible for the progressive ideas, policies, and traditions of the nation to penetrate. There were 110 counties where more than twenty-five per cent of the people, according to the last official United States census, were unable to write their own names or to read a line of print.

In a survey recently completed by the United States Bureau of Education, it was found that fifty per cent of the people of the world are unable to read or write. This situation ranges all the way from no illiteracy in Iceland and Denmark to 85.3 per cent in Brazil, 91.2 per cent in Egypt, and 92.1 per cent in India. A World Illiteracy Commission has been formed by the World Federation of Education Associations to stimulate all nations to combat illiteracy, and has been given the special task of preparing a handbook for guidance of the nations in such efforts. This Commission also has headquarters in the American Red Cross Building, Washington, D. C. See EDUCATION (Modern Tendencies in Education). C.W.S.

Illiteracy Statistics in the United States. The general average of illiteracy in the American republic is six per cent of the population; in literacy, the country occupies tenth place among the nations of the world, as stated above. In some sections of the United States, illiteracy remains large on account of the backward condition of the colored population and of some classes of immigrants.

The last report of the Federal Bureau of the Census presented statistics of illiteracy in all the states, and the figures appear in the map on page 3365.

In Canada. Ontario has the smallest percentage of illiterates among the Canadian provinces, about six per cent; in Prince Edward Island, it is close to seven per cent. The other provinces range from eight to twelve per cent, while among the very mixed population of the Northwest Territories, largely Indians and Eskimo, it is about sixty-five per cent.

ILLUMINATING GAS. See GAS, subtitle.

ILLUMINATION, INTENSITY OF. See LIGHT, subhead.

ILLUSION, *il lu' zhun.* See PERCEPTION; HALLUCINATION.

ILLYRIA, *ih lir' ih ah.* See ALBANIA (History).

ILLYRICUM, *ih lir' ih kum.* See AUGUSTUS (map).

ILOILO, *e lo e' lo.* See PHILIPPINE ISLANDS (The Cities).

ILONGOTS, *e lohn gohts'.* See PHILIPPINE ISLANDS (Filipinos and Other Races).

IL TROVATORE, *eel tro va to' rah.* See OPERA (Some of the Famous Operas).

IMAGES. See IDOL; ICONOCLASTS.

IMAGES (in optics). See LENS; MIRROR.

IMAGINATION, *im aj ih na' shun.* The Bible tells us that "where there is no vision the people perish," and Napoleon, at the height of his career, said, "Imagination rules the world." Imagination is the great index finger of civilization that has pointed out the pathway of progress through the ages. It carved the Sphinx, reared the Pyramids and the temples of the Nile; it created the Parthenon, the Apollo Belvedere, and the Venus de Milo; it "rounded Saint Peter's dome" and spread upon the walls of San Sisto the *Sistine Madonna*, a vision of heavenly love for all time. Later, it gave the world the suspension bridge, the steel arch, the printing press, the steamboat, the locomotive, the telegraph, the telephone, the electric car, the automobile, radio, and the airplane, to bind together the nations of the earth.

It has given us the sewing machine, the vacuum cleaner, the cream separator, the reaping machine, and untold other inventions for the benefit of city and country, lightening the burdens and contributing to the culture and refinement of the industrial world.

The works of the great composers—Handel's *Messiah*, Wagner's *Parsifal*, and the symphonies of Beethoven—are all works of the imagination. All the great works of literature, from the *Iliad* of Homer to modern times; *Paradise Lost*, *Faust*, the *Divine Comedy*, *Hamlet*, *Macbeth*, and all the other great dramas are products of this power of the mind. Says Shakespeare:

And as imagination bodies forth
The forms of things unknown, the poet's pen
Turns them to shapes and gives to airy nothing
A local habitation and a name.

What the Imagination Is. It is easier to tell what the imagination does than to tell what it is. Many definitions have been given, and some of them seem to convey opposite meanings. One school of psychologists considers memory to be a form of imagination. The followers of this school call memory the *reproductive* imagination, and what is ordinarily considered imagination, the *constructive* or *creative* imagination. However, the most recent authorities consider these activities of the mind as distinct. We may say, then, that imagination is that form of mental activity which constructs mental images different from those actually experienced. Memory recalls images of past experiences as they occurred; imagination projects our ideas and experiences into the future in modified form, the form which we wish them to take. The office clerk on a small salary sits in his lonely room and constructs a future in which he sees himself as a wealthy man owning a large business and a beautiful home, and the vision is so clear that, then and there, he resolves to become wealthy and influential. From that time on, he leads a life devoted to a definite purpose. The schoolboy sees himself as a college student and puts forth his effort in preparation for entrance to the school of higher grade, and so on. It is through the imagination that we form our ideals or project ourselves into the future. When these ideals are adopted, we put forth our efforts to attain to them; hence imagination is the power that leads one or makes one progressive.

Many who do not realize what the imagination does consider it merely as the power of fancy and hallucination. Nothing could be further from the truth. To be sure, it is through this activity of the mind that we derive our fancies and daydreams, and the child creates the world of myths in which he largely lives; but the imagination grows as the mind develops, and soon leaves the world of myths and dreams for that of realities. We should regard the imagination as one of our most precious possessions.

In Childhood. Early in life the child begins to combine his experiences into original mental products. He weaves his world of fancy and happily dwells therein, although it often differs widely from the world of reality. The stick becomes a horse, a bundle of rags a baby, and blocks and papers may form a collection of wild and domestic animals. From the third to about the eighth year, myths and fairy tales afford the greatest enjoyment because they harmonize so closely with the child's mythical world. To him at this time, these myths are more true than the actual facts discerned by his elders. The child's craving for myths and fairy tales should be satisfied, both for his present and his future good. These tales em-

body for him the greatest truth. Moreover, without a knowledge of folklore, he cannot in after years comprehend the best in literature and art. "The language that Homer and Vergil and Spenser and Shakespeare and Dante and scores of others of the past have spoken is jargon to him who has no understanding of the simpler, obscure, and forgotten masters, who in the folklore of the people of all times have left a world of rarest story for the children of ages yet unborn."

Because of their limited knowledge and experience, children often make exaggerated statements or statements which have no foundation in fact. Those unacquainted with child psychology are prone to regard such statements as falsehoods and to brand children as "little liars." This is a gross error. The child describes the mental pictures his imagination creates. These pictures are real to him, and in his narrations he has no thought of misrepresentation. It does not follow, however, that children should be left without guidance in the development of the imagination. Unless the child is led to correct his mental pictures as he gains in experience, and to use reason and common sense in the exercise of his imagination, the habit of exaggerating may become so firmly fixed that he cannot break it off. Such a one in due time becomes a "professional liar." At the age of twelve, the child should have his imagination so trained that he can construct mental pictures which conform to existing facts; that is, he should be able to give accurate and reasonably complete descriptions of what he has read or what is told to him. See CHARACTER TRAINING (Value of the Imagination).

In Maturity. The products of the imagination may be divided into two classes, the real and the unreal. The mature mind has its flights of fancy, and all are given more or less to daydreaming and "building castles in Spain." This dreaming is natural, and unless carried to excess, beneficial, for it is a means of fashioning our ideals. The imagination of a well-balanced mind, however, is employed in creating the real. In this way we use our imagination in business, in invention and scientific discovery, in developing systems of government, and in the thousand and one ways which contribute to the welfare of the individual and the progress of society.

There are two classes of ideas which should be carefully distinguished—those that will always remain unreal and those that may become real. For instance, we may join the body of a woman to the tail of a fish and create the image of a mermaid, but we do not believe that such a being exists, or ever will exist, because the combination of elements forming the picture is contrary to all known laws, and because no such object has been

seen. On the other hand, many inventions when first projected are pronounced "mere figments of the brain" and considered impracticable, but experience has proved most of these inventions to be practical and useful, and many of them have been so interwoven into the industrial and social life of the world that they are now indispensable. Such are the telegraph and the electric light. Those who give undue attention to the creation of the unreal are seldom successful in practical affairs, but their creations are sometimes of great value to the world. Should we withdraw from literature the works of Shakespeare, Milton, Victor Hugo, Dante, Longfellow, Lowell, Hawthorne, and scores of others, the race would suffer an irreparable loss, and the same may be said of the great works in music and art.

It is not only in the realm of the material that the imagination enables us to make progress. Imagination working with reason has enabled men to think out and set in order the laws that govern the nations of the earth, to find practical application for those universal principles—truth, love, justice, freedom—that lie at the foundation of character. This is why the works of Plato, Kant, and other great philosophers will last through all time.

Imagination makes us happy or miserable. Fear and worry are but results of imagining conditions which we anticipate, and the anticipation is usually stronger than the reality. This may also be true of our anticipation of pleasure, though a slight disappointment in the reality brings us no harm. It naturally follows that a clear conscience and clean thinking are important factors in the production of our mental images.

Thyself within! Thyself within!
O friend! find here thy strength, thy peace,
Pray not that loss and change may cease—
Pray rather, higher heights to win!
Thy spirit Godward wins release,
And soar thee where thou art akin!

Culture of the Imagination. Because of its nature, imagination is more likely to be abused than any other form of mental activity. Unless it is curbed by the reason, it is apt to run away with us. All other activities of the mind aid in giving culture to the imagination. Therefore he has the most useful imagination whose mind has been so trained that all its activities are harmoniously developed. The following suggestions will be found helpful to those interested in the mental training of children:

1. The products of the imagination can contain nothing that is not previously in the mind. Observation (perception), then, is the first step in the culture of the imagination.

2. Ideals depend largely upon one's association and environment. Not only is it true that "evil associations corrupt good manners," but they also create

thoughts and mental pictures that no pure mind can entertain. See that children are placed amid suitable surroundings.

3. Literature exerts a powerful influence upon the imagination. Tell stories and read books to children that convey their own moral without comment, and in that way aid in the formation of high ideals.

4. Play is actuated by and gives culture to the imagination. Children should have opportunity to play and should be taught good games (see **PLAY; GAMES AND PLAYS**).

5. Within the limits of their mental capacity, children should be encouraged to construct and invent. Oral and written composition are among the best means of giving culture to the imagination. Encourage pupils to put as much life and beauty as they can into their recitations in language, reading, geography, and history. Discuss with them the books they read, and encourage them to describe the leading characters and to tell why they like or dislike them.

6. Remember that the imagination is a practical activity and that it is associated with every complete mental act.

7. Ideals are progressive, and that they may be effective they must be tangible, that is, within the grasp of the child's understanding; otherwise he will find no interest in them. When the ideal is chosen, the teacher and parents should see that it progresses as the child gains in experience. See **PERCEPTION; MEMORY; FEELING**. C.E.S.

IMAGO, *im a' go*. See **METAMORPHOSIS; INSECT** (The Developing Insect).

IMAM, *ih mahm'*. See **OMAN**.

IMATRA, *im ah trah'*, **FALLS**. See **FINLAND** (The Country).

IMITATION. See **WILL** (Psychology).

IMMACULATE CONCEPTION. See **MARY, THE VIRGIN**.

IMMIGRATION. See **EMIGRATION AND IMMIGRATION**.

IMMIGRATION, ORIENTAL. See **CALIFORNIA** (History); **BRITISH COLUMBIA**.

IMMORTALITY, a continuation of existence, in some form, after the dissolution of the body; the doctrine that the human soul survives the death of the body, and exists forever. Belief in immortality, in some form, has been a part of almost all religions. Life after death was believed by the ancient Greeks and Romans to be a shadow of the present, and the spirits of the dead were supposed to inhabit the invisible world as shadowy forms. Among other people, it is believed that the mind and soul improve and develop after the death of the body. With most nations, the belief in immortality is as fixed as the belief in God; in fact, the two beliefs are closely associated in the minds of most men. Joseph Addison, in *Cato*, says:

It must be so,—Plato, thou reasonest well!
Else whence this pleasing hope, this fond desire,
This longing after immortality?
Or whence this secret dread and inward horror
Of falling into naught? Why shrinks the soul
Back on herself, and startles at destruction?

'Tis the divinity that stirs within us;
'Tis Heaven itself that points out an hereafter,
And intimates eternity to man.
Eternity! thou pleasing, dreadful thought!

IMMORTELLE, *im or tel'*, the name applied to certain species of aster-like plants whose flowers when dried retain their natural form and color indefinitely. They are the largest of the so-called *everlasting flowers* (see **EVERLASTING FLOWER**). In France two species are grown especially for use in funeral wreaths. They are used in their natural yellow color, bleached white, or dyed purple and red. B.M.D.

Scientific Names. These plants belong to the genus *Helichrysum*, of the family *Compositae*. The species include *H. arenarium* and *H. orientale*.

IMMUNITY, derived from the Latin *in* and *munus*, meaning *not serving*, signifies exemption from duty or service. In law, immunity is an exemption from serving in an office or performing duties required of other citizens.

In Medicine. Immunity also refers to the condition of an individual who is not susceptible to certain diseases. Immunity in persons and animals may be either *natural* or *acquired*. Natural immunity is possessed by certain persons, families, races, and animal species. Horses, cats, and dogs are naturally immune from tuberculosis. Acquired immunity is a condition resulting from a previous attack of a disease or from *inoculation* or *vaccination* (both of which see).

This type of immunity can be divided into two groups—active immunity and passive immunity. In the former, the actual disease organisms are killed and injected into the body. This process causes the formation of protective anti-bodies, which are built up by the body to combat the disease. In the latter instance, the organisms are first injected into an animal, usually a horse. The animal reacts by forming the protective anti-bodies. After these are formed, some of the blood serum of the horse is obtained, which contains these substances. This in turn is injected into the body of man, thus furnishing him an immunity from the particular disease. This type of immunity is called passive because man is merely the recipient of the anti-bodies built up elsewhere, he himself taking no part in their formation. K.A.E.

IMPAIR. See ROULETTE.

IMPEACHMENT, *im peech' ment*. In law, a government official is impeached when an authorized legislative body calls him to account for conduct unworthy of his office, and requires him to defend himself against the charges. An impeachment is an *accusation* only, presented in legal form, and it does not necessarily imply that the accused is guilty.

English and Canadian Customs. In England the House of Commons makes the accu-

sation, and the House of Lords is the court which tries the case. The most famous impeachment trial in English history was that of Warren Hastings (which see), the proceedings in this case lasting eight years. The British North America Act, the constitution of the Dominion of Canada, provides that judges of the superior courts may be removed by the Crown as a result of successful impeachment by the Dominion Parliament.

In the United States. When an officer of the United States government is impeached, the accusation must be voted by the House of Representatives. The Senate becomes the court of trial, with the Vice-President of the United States as presiding officer, except when the President is tried. The Constitution provides that the Chief Justice of the Supreme Court shall preside at the trial when a President is impeached, as the Vice-President, who would succeed to the office in case of conviction, might not preside without prejudice. The vote of the Senate is taken by putting the question separately to each member, a majority vote of two-thirds of those present being required for conviction.

Officers of the states are impeached by the lower house of the state legislature and are tried by the upper chamber, the senate.

An officer found guilty under impeachment charges may be removed from office and disqualified from holding any other office of honor, trust, or profit under the United States. Impeachment proceedings can extend no further than to determine a man's fitness to continue in his position of trust; further punishment must be meted out by a regular court of law.

Eleven times in the history of the United States has the House of Representatives voted articles of impeachment; three convictions resulted:

(1) William Blount, Senator from Tennessee, was impeached on July 7, 1797, for conspiring to wage war with Spain in favor of Great Britain, and for attempting to stir up the Cherokee Indians against Spain and the United States. His trial lasted from December 17, 1798, to January 14, 1799, and resulted in his acquittal.

(2) John Pickering of New Hampshire, judge of the United States District Court, was impeached in 1803 for drunkenness and profanity on the bench, and for unlawful decisions. He was found guilty and removed from office.

(3) Samuel Chase, associate judge of the Supreme Court of the United States, was impeached in 1804 for injudicious actions and decisions in several political trials. He was acquitted in March, 1805.

(4) James Peck of Missouri, judge of the United States District Court, was impeached in 1830 for arbitrary conduct while trying a case. In January, 1831, he was acquitted.

(5) West H. Humphreys of Tennessee, judge of the District Court of the United States, was impeached in 1862 for giving support to the secession movement and unlawfully acting as judge of the Confederate

District Court. He was found guilty and removed from office.

(6) Andrew Johnson, President of the United States, was impeached in 1868 for violating the Tenure of Office Act, for corrupt use of the veto power, interference at elections, and other high crimes and misdemeanors. His case came to trial on March 30 and ended on May 26. Thirty-five senators voted him guilty, nineteen declared for his acquittal. The votes lacked one of a sufficient number to convict, and he was therefore acquitted. See JOHNSON, ANDREW.

(7) William W. Belknap, Secretary of War of the United States, was impeached in 1876 for accepting bribes. He was acquitted.

(8) Charles Swaine of Florida, judge of the District Court of the United States, was impeached in 1905 for misconduct in office. He was acquitted.

(9) Robert W. Archbald, associate judge of the United States Commerce Court, was impeached in 1912 for entering into corrupt alliances with coal-mine owners and railroad officials while in office. In January, 1913, he was found guilty and removed from office.

(10) On June 12, 1914, District Judge Alston G. Dayton of West Virginia was impeached. Proceedings were dropped without trial, March 15, 1915.

(11) In April, 1926, District Judge George W. English (Illinois) was impeached for misdemeanors. He resigned before the trial.

Jurists of wisdom and experience recognize the benefits arising from prosecutions of this nature. Men who are high in position, influence, and authority are sometimes brought to justice in no other way. Furthermore, the solemn nature of the proceedings, the wide public attention they command, the far-reaching effect of the verdict—whether it proclaims the innocence of the accused or places him before the people as one faithless to the trust reposed in him—all tend to make a lasting impression on the public mind. E.D.F.

IMPERATIVE MODE. See **MODE**, subhead.

IMPERATOR, *im pe ra' tor*, a regal title. The Romans gave the name to certain magistrates and to victorious military commanders. During the days of the republic, the title carried with it no suggestion of imperial power. Julius Caesar used it continuously for some years previous to his death, and his nephew Caesar Augustus made *imperator* synonymous with *emperor*. The sovereigns of Britain, as emperors of India, cause the letters *R. I.* (Rex Imperator) to be stamped on all British coins, and the king signs the letters after his name on all official documents, as *George R. I.* The last German emperor, William II, employed the letters in the same manner.

[*Imperator* is a Latin term meaning *commander*, or *leader*.]

IMPERIAL BUSHEL. See **BUSHEL**.

IMPERIAL CONFERENCE. See **BRITISH EMPIRE**, AND **BRITISH COMMONWEALTH OF NATIONS**; **NEWFOUNDLAND** (History); **CANADA** (History: Imperial Conference in London).

IMPERIALISM, *im pe' ri al iz'm*, a govern-

mental policy of a country which seeks territorial expansion throughout the world. The leading country in expansion has been Great Britain, which has followed a benevolent policy wherever its flag has been planted. In the United States, it has been a debated issue, as each acquisition of new territory outside of the continental limits has met with much opposition from so-called "anti-imperialists." At the close of the Spanish-American War, "imperialistic" policies were debated with vigor; the acquisition of Porto Rico and the Philippine Islands aroused the protest of many, on the ground that it was tending toward imperialism, and this issue was emphasized by William Jennings Bryan in his campaign against McKinley in 1900. On December 2, 1901, the Supreme Court decided that a limited imperialism, which aims at improvement, education, and advancement of the population was within the scope of the national government. See **COLONIES AND COLONIZATION**.

IMPERIAL GALLON. See **GALLON**.

IMPERIAL ORDER OF THE DAUGHTERS OF THE EMPIRE. See **WOMEN'S CLUBS** (Canada).

IMPERIAL VALLEY. See **ENGINEERING** (Contribution of Engineering to Human Welfare); **CALIFORNIA** (Surface Features).

IMPLUVIUM, *im ploov' vih um*. See **ATRIUM**.

IMPOST, a customs duty. See **CUSTOMS DUTIES**; **TARIFF**.

IMPRESSIONIST, *im presh' un ist*, **SCHOOL OF PAINTING**, the name given to a group of French painters who astounded and dominated the art world during the last quarter of the nineteenth century. The impressionists gained their name by essaying to paint the absolute truths of nature from direct, personal impressions. Their art took small account of "story" subjects or historical anecdotes and episodes, such as had occupied so much of the interest of their predecessors; they were content with the brilliant representation of actual scenes and of life as it went on about them. Their attitude, or conviction, is well expressed in a saying of Edouard Manet, who is credited with being the founder of impressionism. Manet, disliking the name of teacher, although he sometimes taught, issued the following dictum: "There is no Manet studio. Should there be one, the by-laws would perforce be like this:

(1) One is prohibited to come to the studio.

(2) One must go and work out of doors."

One of the chief results of this determination to avoid "studio" effects was a tremendous gain in actual knowledge of light and color, a knowledge which when put into practice brought a hurricane of ridicule against its discoverers. A particular point which fired the wit of adherents of the older schools was the



Work of the Impressionist School. Above, a river scene, by Renoir. Below, "The Church of Vetheuil," by Claude Monet, now in the Luxembourg Gallery, Paris.

impressionist devotion to purple shadows. Studio influences in a day when glass was scarce had convinced many honest painters that all respectable shadows were of a soft, enveloping brown. Painters of the Flemish school, especially, through working in rooms with perhaps one tiny window, had developed the beauties of chiaroscuro to a high degree, and the world in general was satisfied. The departures of the impressionists were unwelcome, and they had to endure many witticisms about purple cows and other phenomena which have since become understandable as simple truths and natural conditions.

If the impressionists were not concerned with the anecdotal pictures of the past, they were, moreover, just as innocent of any thoughts of symbolism, expressionism, or any of the forms of deliberately subjective painting which have since held the stage. Their intent was frankly objective. They saw the thing and painted it. They are proved by time to have been hearty, witty men with a fine genius for depicting the sparkling beauty of life as it encompassed them. Of course they saw life, each through his peculiar temperament, and in that sense only are the paintings subjective in character, and to that extent do their works vary with the individual. So wide, however, are the differences among these men that some critics of to-day have said that there was, after all, only one complete impressionist, Claude Monet, and that he was the beginning and the end of the school.

The impressionists won their battle, and Claude Monet, who died in 1926, lived to see an ever-increasing glory clothe the name of impressionist, even after the impressionist point of view had ceased to be accepted by the newer painters as the last word in painting. To-day the works of Manet, Monet, Degas, Renoir, and Pizarro are seen in the finest collections, where they are rated as master paintings. Manet is known mainly for figure painting and composition; Monet clung to landscape, painting exquisite canvases of his own garden; Degas won renown with his ballet girls; Renoir reveled in scenes of everyday life; and Pizarro was fondest of landscape.

Two black and white reproductions are given here. The reader, by comparing these with the cubist painting reproduced on page 1781, will find it difficult to guess what there was in the impressionistic art that made it seem so wild and radical in its early day. See MANET, EDUARD; MONET, CLAUDE. G.St.C.

IMPRESSMENT OF SEAMEN. See WAR OF 1812 (Causes).

IMPRISONMENT FOR DEBT. See DEBT.

INARCHING. See GRAFTING.

INCA, the name of a wonderful family of Peruvian Indians, believed by some to have been a royal caste or family which was power-

ful at the time of Spain's conquest of the South American continent. The war chief of the tribe was called "the Inca"; this office was not inherited, but was usually filled by selection. The tribal dialect was called *Quichua*. When Huayna Capac ascended the throne of the Incas in 1475, the empire reached its summit of splendor. Its government was the strongest and finest in South America.

The Incas were expert farmers who irrigated their lands, erected large granaries, and built roads to all parts of their empire. Their windowless houses were built of sun-burned bricks or granite, and were about eight feet high. They owned great quantities of gold, which was used lavishly in the decoration of their palaces and temples. The capital of the empire was at Cuzco, but Atahualpa moved it to Quito, just before the arrival of Pizarro, to secure himself against attack by his brother, who started a rebellion.

The Incas were conquered by the Spaniards in 1523, but they were not exterminated, and their descendants are now civilized, respected inhabitants of Peru. The largest and most important Inca ruin discovered in South America since the days of the Spanish conquest is Machu Picchu, which was found in 1911. The ruins of buildings made of blocks of granite, beautifully fitted together, represent the most refined style of Inca architecture. Explorers believe that Machu Picchu may prove to be Tampu Tocco, the mythical place from which the Incas came when they started out to found Cuzco and to build the foundation of their great empire.

Related Subjects. The reader is referred in these volumes to the following articles:

Atahualpa Peru (Cities; History) Pizarro

INCANDESCENT, in *kan des' ent*, **LIGHT**. See ELECTRIC LIGHT, subhead.

INCANTATION, a word or a formula used in enchantment and sorcery, among ignorant and savage peoples. Incantations have been used for healing purposes, for bringing rain, and for punishing enemies. See MAGIC.

INCENSE, in' *sens*, a substance made from resins, sweet-smelling gums, balsams, and similar ingredients, which, when burned, gives off a delicate fragrance. Among the ancient Jews the burning of incense was considered an act of worship, and it had a place in early Christian ceremonies, although its use was condemned by such men as Tertullian and Augustine. The burning of incense was not firmly established in the Roman and Greek churches until the fifth or sixth century. To-day, it is used in Catholic burial rites and at high mass, as well as in the communion services of some Episcopal churches. Its use is also common among Buddhists. The powdered incense, poured into a metal vessel, the censer (which

see), containing burning charcoal, is melted by the heat, and it emits a sweet perfume and a bluish, vapory haze. The censer, suspended by chains, is swung, either by the priest or by an attendant, about the altar or sanctuary. There are many references to incense in the Bible.

INCH. See DENOMINATE NUMBERS.

INCIDENCE, ANGLE OF. See LIGHT (Reflection of Light); REFLECTION.

INCISORS, *in si' zurz.* See TEETH.

INCLINED, in klynd', PLANE, in physics, one of the so-called six simple machines (see MECHANICAL POWERS). Its practical use

is for moving heavy weights, at an expenditure of relatively small force. When, for instance, a load is pushed up a slanting plank into a vehicle, less effort is expended than if the load were lifted vertically. At the same time, the load must travel a greater distance.

INCLINED PLANE

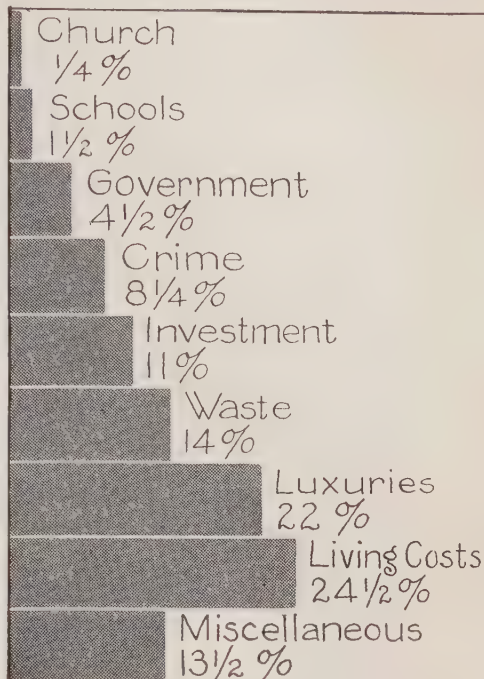
Application. A man wished to load a barrel of molasses weighing 200 pounds into a truck $3\frac{1}{2}$ feet high. He took a plank 14 feet long, placed one end on the truck and the other on the ground, then rolled the barrel up the plank. How many pounds of force did he apply to move the barrel?

Let w represent the weight, l the length of the plank (the inclined plane), h the height of the truck and plane, and f the force applied. The work that must be done is the same whether the barrel is lifted straight up or is rolled up the incline. Work is always equal to the force times the space. Therefore, $f \times 14 = 200 \times 3.5$. Whence $f = 50$. In other words, a force of 50 pounds was sufficient to roll the barrel of molasses onto the truck, whereas, if it had been lifted vertically, a force of 200 pounds would have been necessary. A little thought will make clear that the longer the plane, the greater the mechanical advantage.

A carriage road winding up a hillside and a section of railroad constructed on a grade, even though the grade be only two or three per cent, are good examples of inclined planes on a larger scale. See WEDGE.

INCOME DISTRIBUTION. Educators deplore the tendency of people to spend so little on schools, and to excuse their comparatively small educational appropriations on the ground that larger sums cannot be afforded. Not a few people have been declaring for years that school taxes are too burdensome, and that the annual tribute to education must be reduced. That

such statements have no basis in fact is well known, but merely to make verbal denial of their truth is less effective than to present



EXPENDITURES OF THE AVERAGE FAMILY

From United States Census reports.

figures in support of the other side of the argument.

Statisticians have made careful investigations to learn how citizens in the aggregate spend their money. Having charted the avenues of expenditure and learned from the government where the dollars go, they present a striking diagram, which is here reproduced. It is true that the figures necessarily change somewhat from year to year, but for any year they are approximately correct, for habits and customs of people change little.

Both the schools and the churches have reason to look with a degree of yearning after some of the money which reaches unproductive ends; even a little shifting of percentages in their favor would vastly benefit the causes of education and religion, and would deprive nobody of any needed thing. Crime—hold-ups, bank robberies, larceny, penitentiaries, criminal courts, and such—takes from the general public about \$1 in every \$12 of income; this condition, deplorable in the extreme has



PRACTICAL APPLICATION

been worse since the World War, but is now somewhat on the decline and is subject to further remedy by a determined people.

Luxuries loom large in the life of every community, but the luxury column is not as discouraging to economists as it is painted in the chart. It is true that the commodities which make up the total of twenty-two per cent in this item might be almost entirely dispensed with; what are called luxuries are not absolutely indispensable to existence, but a good proportion are actually necessary if much joy is to be derived from life. Luxuries, by official designation of the Census Bureau, include musical instruments, radio sets, talking machines, children's toys, tickets to moving picture theaters and to playhouses, books, motor cars, etc. Almost as much is spent for these as for actual necessities.

The item of waste emphasizes an American trait that can have no apologists. It is a matter of record that the average family wastes enough from its dining table to feed an ordinary family of Central Europe, where frugality is essential to existence.

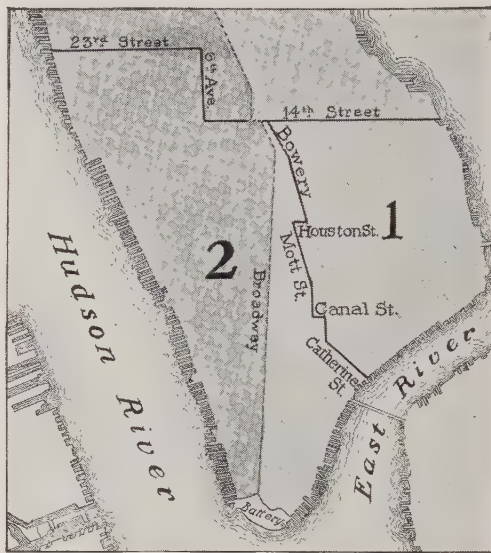
What added power would inhere in the family if father could add to the investment column each year, one-half of what now goes for waste!

INCOME TAX, a tax levied on incomes. It may be collected from individuals or firms actually receiving the income, or it may be deducted "at the source"; that is, the persons or firms who pay an income tax may deduct such tax as is paid at the source, from the amount of their tax paid on salary, interest, rent, or other items. Such a tax may be proportional, in which case it is a fixed percentage on all incomes, or it may be progressive, that is, made relatively greater for large incomes than for small ones.

In nearly all countries which levy an income tax, it is customary to exempt from taxation all incomes below a certain amount. The theory of such exemptions is that a certain income is necessary to existence or to the maintenance of a standard of living; in either case, this minimum should be exempt, because a tax would mean that the state would have to repay the tax in the form of relief for the poor, or else would lower the standard of living. Both of these results would be undesirable. Some economists believe, moreover, that earned income should be treated differently from income derived from property. If the income is derived from investments (or from inherited wealth), the tax should be larger, they say, than if a man works for a salary or manages his own business, because in these cases the income ends with one's working life.

In the United States. In the United States, as early as 1812 the Secretary of the Treasury advocated a Federal tax as a war measure, but his advice was not heeded. In 1862 Congress

passed an income-tax law which remained in force until 1872, and yielded a total of \$376,150,204. It was not very satisfactory in its operation, and no further attempt was made to tax incomes until 1894. The income-tax law of that year was declared unconstitutional



WHERE EXTREMES MEET

The map represents the lower portion of New York City. The two divisions shown are Federal districts for collection of income and corporation taxes. The second district is the richest region in the world—two square miles in which about 15,000 persons normally have incomes exceeding a billion dollars. From here the government collects more than one-fourth of its total income tax and nearly one-fifth of its corporation tax. The first district is the most populous spot in America, and possibly in the world; it contains the famous "East Side," or the Ghetto, and it contributes practically nothing to either tax.

by the Supreme Court of the United States on the ground that it was a direct tax, and was not divided among the states according to population, as required by the Constitution. The desirability of a Federal income tax, however, was slowly becoming recognized, and a movement arose to amend the Constitution so that such a tax need not be proportioned among the states according to population. This amendment—the Sixteenth—was submitted by Congress to the states in 1909 and was declared ratified in 1913. It was phrased as follows:

The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several states, and without regard to any census or enumeration.

The way then being clear, an income tax was incorporated in the Underwood-Simmons tariff law of 1913. This law provided for a normal tax of 1 per cent on incomes up to \$20,000, and a surtax, or additional tax, on

incomes above that sum. The rates have been changed several times since this law went into effect, being greatly increased during the World War, when the need for revenue was excessive, and gradually reduced since that time. All of these laws provided for exemptions of various kinds, including contributions to charity and religion, the support of dependents, and personal exemptions. The law of 1929 imposed a tax on single persons with incomes above \$1,500; married persons are given exemptions of \$3,500, and \$400 for each dependent child under eighteen years of age, or older persons incapable of self-support because mentally or physically defective. Earned incomes reduce the tax 25 per cent.

The taxpayer pays $\frac{1}{2}$ per cent normal tax on the first \$4,000 net income, 2 per cent on the next \$4,000, and 4 per cent on the remainder. If the net income exceeds \$10,000, there is an added *surtax*; this begins at 1 per cent on sums from \$10,000 to \$14,000, and increases until the surtax is 20 per cent.

The income tax was an important agency in the raising of vast war sums. At the highest point, the normal tax was from 6 to 12 per cent, and the surtax as high as 65 per cent on the largest incomes. Since the war, the government needs have gradually lessened, and the rates to-day are but slightly higher than those of the original law of 1913.

At various times a number of the states have made experiments in the direction of taxing incomes. Massachusetts and Virginia have had income laws in effect since 1843. Other states which followed their example include North Carolina, Oklahoma, Wisconsin, Connecticut, Missouri, New York, North Dakota, Arkansas, and Oregon. Wisconsin has what has been declared a very satisfactory system, administered by an efficient tax commission.

In Canada. The Canadian Federal government, like that of the United States, was forced to find other sources of revenue by the demands of the World War. The first war income tax was imposed in 1917, and increases were made in 1918 and 1919. The law enacted in 1919 provided for a normal rate of 4 per cent on incomes up to \$6,000, and for a rate of 8 per cent on those over \$6,000. The surtax ranged from 1 per cent to 65 per cent, the latter rate applying to incomes exceeding \$1,000,000. As in the United States, these rates were substantially reduced after the war period. Income taxes are also in force in some of the provinces.

Other Countries. Although a limited form of income tax was in force in England for a

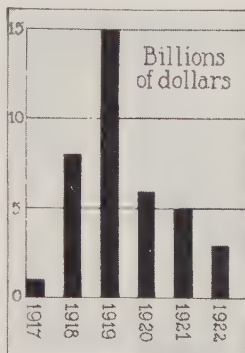
few years in the middle of the fifteenth century, this form of taxation is distinctly a nineteenth-century device. It was first used by England during the Napoleonic wars, soon after 1800, when the nation's huge expenditures made new sources of revenue necessary. It continued in force as a war measure until 1815, but in 1842 it was revived and has since been a fixed feature of the English fiscal system. Soon after the outbreak of the World War, in 1914, the British income tax was greatly increased, especially on the largest incomes; this was one of the quickest and surest methods of increasing the government's revenue. Italy, Holland, Austria, Norway, Spain, Sweden, Denmark, Switzerland, France, and Germany have also adopted this form of taxation, and in the countries which participated in the World War, the rates are very high as compared with those in the United States and Canada. The income

tax is also in operation in Australia and India.

INCREMENT, *in' kre ment*, UNEARNED, is a term applied to that increased value of land which is not due to the efforts of the owner, but to public or private improvements in the vicinity, and to the development of the neighborhood, the growth of population, and similar factors. Henry George based his theory of the single tax upon unearned increment; he believed that unearned increase of value is equivalent to income and, therefore, should be taxed, and that land value should be the only source of taxation. In England, twenty per cent of unearned increment is now taxed, and there is a growing senti-

ment and practice in the larger cities of America, to raise the assessment on land. It is argued that, if a community profits from unearned increment, it should in some way be responsible for a falling off in valuation. See SINGLE TAX.

INCUBATOR, *in' ku bay tor*. When large flocks of chickens, geese, or ducks are desired, the most simple and economical way is to hatch the eggs artificially; that is, to place them in a machine called an incubator, especially built and prepared for the purpose. This machine looks much like a square wooden table, with two drawers and a small lamp or heater attached to one side. Within are two trays: the upper one, which is several inches shorter than the lower, is used for the eggs, while the lower one is for the little chicks to stay in, while drying, the first day after they are hatched. As soon as the chick hatches, it goes toward the light, which comes in from a glass door at the front of the incubator, and when it reaches the edge of the egg tray, it



UNITED STATES GOVERNMENT DISBURSEMENTS
Covering the period of the World War.



RING, RING FOR LIBERTY

INDEPENDENCE DAY

SUGGESTED PROGRAMS

I

Hail, Independence, hail! Heaven's next best gift
To that of life and an immortal soul!

—Thomson

Song, *America*

Essay, *The Story of the Declaration of Independence*

Reading of the Declaration

The Rising in 1776.....Read

Essay, *What Is True Patriotism?*

Concord Hymn.....Emerson

The Battle of Lexington.....Lanier

Essay, *Why I Love My Country*

Ticonderoga.....Wilson

Tableau, *The Spirit of Seventy-Six*

After the painting by Willard

The Old Continentals.....McMaster

The Little Black-Eyed Rebel.....Carleton

Essay, *A Tribute to Washington*

The American Flag.....Drake

Song, *Hail Columbia*

2

Oh, let freemen be our sons,

And let future Washingtons

Rise to lead their valiant ones,

Till there's war no more. —Pierpont

Song, *Columbia the Gem of the Ocean*

The Ship of State.....Longfellow

Flag salute

Girls may be dressed to represent
the states

The Name of Old Glory.....Riley

Grandmother's Story of Bunker Hill...Holmes

Essay, *The "Sane Fourth" Movement*

Song of Marion's Men.....Bryant

Essay, *A Tribute to Franklin*

The Flag Goes By.....Bennett

Essay, *What My State Has Done for the Country*

America for Me.....Van Dyke

Paul Revere's Ride.....Longfellow

Nathan Hale.....Finch

Song, *Star-Spangled Banner*

falls to the lower compartment. The eggs of hens require three weeks to hatch, while those of geese and ducks require four weeks.

Great care in regulating the heat and ventilation, both inside and outside the incubator, is essential to success in hatching a large brood. A uniform temperature of 102° F. around the trays should be maintained for the first two days after the eggs are laid on the tray, and this should be raised to 103° for the rest of the time. Beginning with the third day, the operator should turn the eggs twice daily until two days before the time to hatch. The incubator should be placed in a room free from drafts and dampness, and be kept as free as possible from jars.

In large commercial establishments, mammoth machines, with a capacity of thousands of eggs each, are used. These are heated by a system of hot-water pipes. F.W.D.

INCUS, in' kus. See **EAR** (The Middle Ear).

INDEFINITE PRONOUNS. See **PRONOUN**.

INDEPENDENCE, KAN. See **KANSAS**

(back of map).

INDEPENDENCE, Mo. See **MISSOURI**

(back of map).

INDEPENDENCE DAY, the national holiday of the American people, commemorating the birth of their nation. It is the anniversary of the adoption of the Declaration of Independence on July 4, 1776. Strange as it may seem, the Fourth of July is not a national legal holiday, for no legislation declaring it to be such has ever been enacted by Congress. However, the day is celebrated throughout the Union, and in all the states but Kansas, Kentucky, Mississippi, and South Carolina it has been designated a legal holiday by statute. In these four states, it is observed by consent.

For many years it was customary to celebrate this day of national rejoicing by spectacular displays of fireworks, and by firing of cannon, pistols, firecrackers, and other instruments of noise. This mode of commemoration often caused loss of life and serious injuries, and a great national crusade was begun to work a reform in this matter. As a result, a "sane" Fourth now prevails quite generally throughout the country. Interesting programs, providing for special speakers, for pageants, games and plays, athletic contests, and the like, are enjoyed in most communities. On Independence Day the Stars and Stripes may be seen floating on public buildings and homes throughout the land.

John Quincy Adams wrote these eloquent words concerning the national holiday:

From the day of this Declaration the people of North America were no longer the fragment of a distant empire . . . They were a nation, asserting as of right, and maintaining by war, its own existence. A nation was born in a day.

INDEPENDENCE HALL. See PHILADELPHIA (Historic Buildings).

INDEPENDENT ORDER OF FORESTERS. See FORESTERS, INDEPENDENT ORDER OF.

INDEPENDENT ORDER OF ODD FELLOWS. See ODD FELLOWS, INDEPENDENT ORDER OF.

INDETERMINATE SENTENCE. In theory, the object of the imprisonment of criminals has always been reformation and not vengeance, but in actual fact, the punishment idea has usually been foremost. The sentence for each crime has been fixed by law or has been left in a degree to the judgment of the court, and little or no account has been taken of the character of the offender. In recent years, however, there has developed a somewhat different attitude toward the penal system. Two purposes, declare reformers, should govern the commitment of any wrongdoer to a reformatory or prison: he should be confined for the safety of society and for his own moral betterment, and his confinement should last long enough to accomplish these purposes, and no longer.

Obviously, they argue, it is impossible for a judge to tell how long a man will require to become fit to mingle again in society, and the sentence therefore should be *indeterminate*—that is, indefinite. The ideal thing, according to prison reformers, would be an absolutely elastic sentence, which imposes no limits, but leaves the question of release or detention to properly selected prison authorities. Nowhere, however, has the principle been pushed to this extreme, nor is it likely to be until conditions

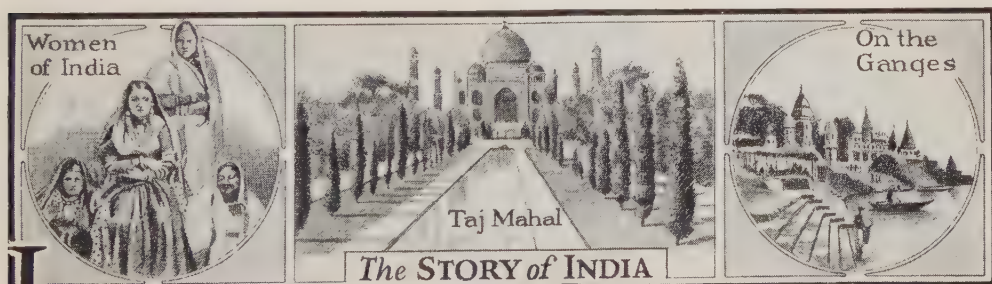
in prisons and reformatories have been considerably changed. Some observers believe the ideal condition is approaching.

But the indeterminate sentence in a more restricted sense—the sentencing of a man for a term of not less than one or more than fourteen years, for instance—is in force in a number of the states and provinces of the United States and Canada. The system was first worked out in New York in connection with the Elmira Reformatory, and later was tried in connection with the state prisons in that state. Gradually it has gained ground, and while it has not been unqualifiedly successful, there exists little doubt as to its superiority over the older inflexible method. See PRISON; CRIME; CRIMINOLOGY.

INDEX EXPURGATORIUS, a title used in the Roman Catholic Church to designate a list of books deemed heretical or immoral, and prohibited by Papal authority until objectionable matter is eliminated. All versions of the Bible by unauthorized persons, books relating to magic, and any book harmful to the faith or morals of a Catholic, are included in the *Index*. In 1557 the first volume of an *Index Expurgatorius* was issued at Rome. Pope Leo XIII revised the list, and about 3,000 books were taken from it. Books are placed under the ban by the *Congregation of the Index*, organized in 1586, which is composed of theologians and cardinals. They exercise their judgment as to whether the book is to be corrected, to be read under certain conditions, or merely by certain classes of people, or is to be banned entirely.

G.W.M.

INDEX GLASS. See SEXTANT.



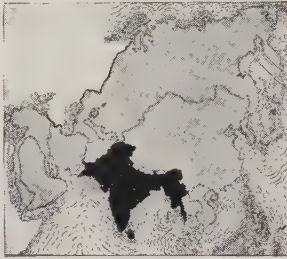
INDIA, a division of Southern Asia which constitutes a great empire under the rule of Great Britain.

A Land of Romance. Few countries in the world make a stronger appeal to the romantic instinct than does India. Far back in ancient times, it was celebrated for its fabulous riches, its manufactures in the home, the royal splendor in which its rulers lived, and the high state of civilization which prevailed. In the Middle Ages, wonderful tales were told of that land beyond the sea and beyond the desert, and

it was the attempt to find a shorter route to its treasures which led to many of those voyages of discovery with which modern history may justly be said to begin. For many years after the British made their influence felt there, India remained a land of mystery; and though to-day it has been thoroughly explored and described, though Kipling and various lesser writers have discovered its value in "literary setting" and have made readers everywhere familiar with much of its life, this strange land still possesses a power over the imagination.

Travelers say that it is one of the countries which do not disappoint the eager visitor; despite the poverty and misery to be seen on every hand, it keeps its romantic aspect as a land veiled, withdrawn, never to be wholly understood by people of the West. Highways teeming with crowded life, temples with wind-swayed bells, grotesque idols, weird priests, "coral strand"—above all, a mind looking back through thousands of years to a time long before the European nations came into being—all of these India means to the person who has allowed himself to feel its spell.

Location and Size. India occupies the central one of Asia's three great peninsulas jutting southward; but the Indian Empire, which is meant by the term India in this article, includes much more than the peninsula. There is a great continental territory to the north, while to the east, beyond the Bay of Bengal, lies Burma, also a part of the Indian Empire. Strictly speaking, however, Burma is not India, and it is therefore given treatment in these volumes in a separate article.



LOCATION MAP

To the north, India is shut off from the rest of Asia by the vast ranges of the Himalayas,

far more effective barriers than the seas which wash its southern shores; and spurs of these mountains separate Burma on the east from Siam. The westward shores of the peninsula are washed by the Arabian Sea, on the south is the Indian Ocean, and on the east is the great curve of the Bay of Bengal. This bay is in itself almost a great sea.

India proper, without Burma, is a fairly compact, though irregular, region, with a north-and-south length of 1,900 miles and a breadth at the north approximately the same. Differing estimates are given of its area, according as the British territory, including Burma, is meant, or the British territory and the native states, which are internally autonomous, that is, independent in their local administration. These states contain one-third of the area and one-fifth of the population of India. The total area, in this latter sense, is over 1,805,000 square miles, of which the native states make up somewhat more than 700,000 square miles; the total population is a little over 319,000,000. India is therefore a little more than half as large as the Dominion of Canada, with thirty-five times as many people. In fact, nearly three-fourths of all the inhabitants of the British Empire live in this one country of India, which is, next to China, the most populous section of the world. The whole of Europe west of Russia—those great countries which have made a large proportion of the world's history—just about equals India in size and in population. Thus one gets a true appreciation of the greatness of India.

The People and Their Cities

This vast body of people is composed of a medley of races, languages, castes, and religions. The numerous races found among the people of India spring from four main stocks. The oldest, though not the most important, are such wild hill tribes of the interior as the *Gonds* and the *Bhils*, descendants, probably, of the earliest inhabitants of the country. Nothing can give a better idea as to the state of civilization which exists among these tribes than Kipling's striking tale, *The Tomb of His Ancestors*. Then there are the aborigines, represented by the *Dravidians* of Southern India and the hill tribes of Central and Northern India; the so-called *Aryans*; and the *Mohammedans*, who are descendants of invaders that came from Arabia during the early centuries of Islam, and, in part, later converts. Most numerous of all are the Hindus, Aryan peoples of pure or mixed race who live in the north-central portion of the country.

Characteristics. These are the peoples of India; and how can any general characteristics be asserted of a nation which is in reality many nations? There are, however, a few gen-

eral statements which may be made. There is a belief in other parts of the world that there is little patriotism in India, but this is untrue. The peoples of the native states are often intensely patriotic, and the new Indian nationality has given rise to the same sentiment in British India. Local patriotism is very strong in both British and native India. For the most part, the people of all races and faiths are industrious, temperate, and patient, make slight demands on life, and endure hardship with an uncomplaining fortitude entirely strange to Western character. Superstition is rife, and is connected with every phase of the religion, which, in its turn, is connected with practically every phase of life. Like most Orientals, these people of India have a fondness for meditation upon mystic subjects which makes it possible for them to grasp easily ideas which the Western world does not understand. Missionaries find no difficulty in convincing them of the incarnation of God in Christ; that to them is a perfectly simple fact, for they have been taught to look upon almost every natural object as the incarnation of some god.

Caste. The population is divided not only into vertical sections by ethnic or political groupings, as in other parts of the world, but also into horizontal strata by the caste system, strata which are so water-tight that not even intermarriage can take place between them.

There are four main castes, the priestly one being the highest, the warrior caste being next, the merchants and agriculturists third, and the servants fourth. Below these are the "untouchables," a stratum which was originally produced by the subjection of aboriginal populations by the invading Aryans. As each successive wave of invasion swept over India, it subjected the previous population to itself and drove it into inaccessible places, and as each wave was enervated by the climate and absorbed in the general population, it laid itself open to subjection by new and vigorous stock. In this and other ways, the caste system, which is unique in the world, and the despair of social reformers, arose.

The four main castes, in the course of ages, have become subdivided into sub-castes and groups to the number of over two thousand. The rules of each caste are very strict and are enforced by caste councils. To be outcaste prevents a man from marrying within his caste, from eating with his caste fellows, and imposes the direst social ostracism. The "untouchables" form a large section of the population, being upward of sixty millions. The British régime has led to considerable amelioration of their lot, special schools having been instituted for them, and the equality of all men before the law, established by the British in direct contradiction to the caste system, has done much to elevate their status, particularly in the lower castes.

Social Customs. These are in large measure the result of the caste system, or of some

other phase of religion. One of the outstanding features has been the seclusion of the women, those of the higher classes scarcely being allowed on the streets; however, this is rapidly changing in behalf of greater freedom. This restriction was not, in practice at least, binding upon the women of the lower social orders, who engage in outdoor work as freely as the men. Then there is the custom of infant marriage, after the age of ten or twelve, and, among the upper classes at least, prohibition of remarriage for women or girls, the widows becoming servants in the households of their husbands' families. When the English entered the country, they found prevalent the custom of *suttee*, or the burning of widows on the funeral pyres of their husbands, but they took at once the most determined measures to suppress it. The same stern measures were used against such pagan rites as the sacrifice of human

beings to the gods, and the putting to death of baby girls because they were not wanted.

It is impossible to give any general description of the dress of the country, so widely does it vary, but for the most part it is picturesque and has that looseness and lightness which a hot climate demands. White is a favorite color everywhere. The mass of the people in India are very poor, and their clothing, as well as their food and their home comforts, must be of the simplest and scantiest, but in great contrast with this condition is the wealth and luxury of the native princes. Some of them possess riches gathered by their ancestors through centuries, and, when dressed in their robes of state, wear gems of almost incredible value. Kipling in his *King's Ankus* gives a fascinating description of the treasure vaults in a ruined palace.

Languages. There is no one national language; indeed, it is estimated that no fewer



Photo: O R O C

A LAND OF CHILD MARRIAGE

A groom of eleven and his bride of eight years of age. He is wearing his wedding headdress. She is resting in her palanquin (see PALANQUIN).



Photo: O R O C

MIDDLE CLASS HINDU GIRL



Photo: O R O C

A MOHAMMEDAN SCHOOL

A school attached to a mosque, where boys learn the Koran by heart—and little else.

than 147 distinct languages are spoken within the empire. But the speech of over half of the people belongs to the Indo-Germanic family of tongues, and is closely allied to Sanskrit (which see). The most important dialects of this language are the Hindi, the Bengali, the Telugu, and the Marathi. One very common language is Hindustani, which is Hindi mixed with Arabic and Persian.

In the southern part of the peninsula, the languages do not belong to this same family, and of these non-Aryan tongues, the Dravidian is the most widespread. Of course, the European languages, French, English, and German, are spoken wherever these nationalities have settled, but they have made little headway among the natives.

Indian Mythology. The Norse myths and the Greek and Roman myths, with all their antiquity, do not date back as far as the myths of India. Some scholars have been led, by occasional resemblances between Indian and Greek mythology, to believe that the latter was an outgrowth of the former; that is, that the Greeks and Hindus were at some prehistoric time in contact, and that the myths continued to show that fact after all memory of the contact had died out. The weight of authority, however, rests with the theory that the resemblances are due to the natural tendency of primitive peoples, confronted with similar conditions, to invent similar explana-

tions. Originally, the Hindus had many gods, representing all the varying phases of nature, but later, most of these gave place to the great trinity of deities, Brahma, Vishnu, and Siva. For the character of these three, and their influence on the life of the people, see the articles **BRAHMA**; **VISHNU**; **SIVA**.

Education. The highest class of all in India, the Brahmans, have never been without an educational system, such as it was, but the mass of the people have been in dense ignorance. While the British have established schools, both elementary and secondary, and universities, poverty, poor communication, and lack of teachers, together with the caste system and superstition, which largely take the place of religion, have prevented all but a comparatively few children from receiving any advantage from them. Somewhat better success has been attained by the missionary schools, which are aided by the government and which draw to them the children from the Christianized families. The universities of Calcutta, Bombay, Madras, Allahabad, and the Punjab, until recently, have been but examining bodies which pass upon the work of the various colleges scattered throughout the country.

Religion. "Ye men of Athens," said Paul as he stood on Mars Hill, "I perceive that ye are in all things very religious"; and the same thing might be said to the people of India, who



Displaying Wares in an Open-Front Store. This shop, in the city of Srinagar, sells clothing, furniture, and groceries. Merchandising throughout the world adopts a great variety of devices to attract customers.

are indeed "very religious." The number of the faiths professed is legion, for the Oriental mind seems peculiarly fitted to the fashioning of beliefs; but one religion is clearly dominant, Hinduism, or Brahmanism. It is this faith, the oldest in existence and embraced by two-thirds of the people, which has laid upon the country the curse of the caste system; this religion is marked by a belief in numerous gods and in the sacredness of the cow. Second as to number of adherents is Mohammedanism, and Mohammedans are an important element in the population. Among the other sects, all of which fall a long way behind these two in numbers, are the Buddhists; the *animists*, or spirit-worshipers; the Sikhs; the Jains, whose temples are the most beautiful in all India; the Parsees, forming a small but powerful merchant class about Bombay; and the native Christians, numbering about four millions, one-half of whom are found in Madras Presidency. It is among the lower classes, those regarded by the Brahman as degraded, that Christianity has spread more rapidly.

The Cities. The population of India, even in the thickly settled parts, lives largely under rural conditions. About nine-tenths of the inhabitants, it is estimated, live outside of the cities, most of them in villages organized on a definite system. There are comparatively few large cities, only Calcutta, Bombay, and Madras having more than half a million inhabitants. These cities, together with Delhi, the capital, and Lucknow, are described in these volumes under their respective titles. The cities of lesser importance are the following:

Agra, *ah'grah*, a city in the United Provinces of Agra and Oudh, lies 110 miles southeast of Delhi. It is one of the oldest cities in India, and many magnifi-

cent structures remain as monuments to an otherwise forgotten glory. Among these is the beautiful Taj Mahal, a mausoleum, or tomb, of the seventeenth century, built by the Emperor Shah Jehan for his favorite wife (see TAJ MAHAL). The city has an important trade in grain, sugar, tobacco, and cotton, and the inhabitants have acquired a world-wide reputation for the manufacture of gold lace and delicate inlaid mosaics. Population, about 186,000.

Allahabad, *al lah-hah bahd'*, whose name means "City of Allah," or "City of God," is the capital of the United Provinces of Agra and Oudh. This ancient city, dating back to the third century B.C., is one of the chief resorts of Hindu pilgrims, who come to have their sins washed away by bathing in the waters of the sacred rivers, Ganges and Jumna, at their junction. It is also the scene of a great religious festival in December and January, when the city becomes crowded with fanatics and beggars. The native town is poorly built, but contains some remarkable buildings, of which the best examples are the great mosque, or Jumma Musjid, the palace of the sultan, and the great citadel of Akbar. This citadel is the center of the fort of Allahabad. The European portion of the town is handsome and well planned.

The city is situated in the midst of an agricultural district and forms the center of a large trade, the chief products being cotton and sugar. Population, about 157,000.

Bangalore, *bang ga lohr'*, a southern fortified town, stands on a plateau 3,000 feet above sea level, and is one of the most pleasant and healthful stations in British India. The modern portion of the town is well planned, with wide, clean streets and handsome buildings. The palace of the maharaja, the ruler of the state, is a structure of great beauty. There are numerous native and European educational institutions, all well supported. The chief manufactures are silks, cotton cloth, woollens, carpets, and gold and silver lace. In the old town stands the fort reconstructed in 1761 and stormed by Lord Cornwallis in 1791. Bangalore is in the native state of Mysore. Population, including the British garrison, 237,500.

Baroda, *ba ro'dah*, an important city on the western coast, about 250 miles north of Bombay. It is the



Photo: U & U

ON THE SACRED GANGES, AT BENARES

Hindu pilgrims bathing in a sacred well of the god Vishnu, on the bank of the river.

capital of the Indian state of the same name. The city is a trade center for the surrounding country, which has an abundant yield of grain, flax, cotton, and tobacco. There are several fine buildings and educational institutions. The population of the state is over two millions; that of the town, about 95,000.

Benares, *ben ah' rez*, is situated almost 400 miles northwest of Calcutta, in the richest plain of all India. This holy city of the Hindus lies on the banks of the Ganges River, in whose sacred waters pilgrims from all over India come to purify themselves. It is a colorful city, with its red and gold-domed mosques and its myriads of minarets rising above the 1,500 temples for which the city is famed.

Sacred cattle are found roaming at will through the steep, crowded streets, and many of the temples are haunted by numbers of sacred monkeys. The inhabitants eye askance all foreigners, quick to resent any imaginary slight to their religious or racial prejudices. But in spite of this deep undercurrent of Oriental religious life, Benares is a busy, flourishing city; and, mingled with the muffled murmurs of prayers and the booming of the temple drums, is the resounding din of brassware and tinkle of jewelry for which, with their fine shawls and embroideries, the bazaars of Benares are noted. Among its jumble of ancient buildings, during recent years many sanitary improvements have been made. Population, about 200,000.

Cawnpore, *kawn' pohr*, is 628 miles northwest of Calcutta and forty miles southwest of Lucknow, on the south bank of the sacred River Ganges, in the United Provinces of Agra and Oudh. This city was the scene of the blackest atrocities of the Sepoy Rebellion in 1857; the European garrison was destroyed by the rebels under Nana Sahib, who indiscriminately murdered men, women, and children. Two hundred victims were cast down a well, now marked by a memorial stone of white marble. See SEPOY REBELLION.

Cawnpore is a flourishing commercial center, noted for its manufactures of cotton, harness, shoes, and other leather goods, and is admirably situated at the junction of four great Indian railway systems. Population, about 216,500.

Hyderabad, *hye dur ah bahd'*, the fourth city in population, and the capital of the Indian state of the same name, which is known also as the Nizam's Dominions, is situated in the central part of lower India, east of Bombay. It lies in a rich mineral and agricultural district.

Hyderabad is a well-enclosed city, on the Musi River, which at this point is spanned by a number of bridges. In the vicinity is located a British military station, at Secunderabad. A striking feature of the city is the Char Minar, or "College of Four Minarets," built above four connected arches, at the intersection of the four principal streets. The Nizam's palace, the Mecca mosque, and the British residency are other points of interest. Hyderabad has extensive and costly waterworks. Population, over 404,000, chiefly Hindus, though under Mohammedan rule.

Jaipur, *ji poor'*, or **Jeypore**, *ji pore'*, capital of the native state of Jaipur, is situated about 148 miles southwest of Delhi. It is a picturesque city of palaces and pink-stuccoed houses in a variety of Oriental patterns, and has fine, broad streets laid out in blocks like no other city in India. The huge palace of the maharaja stands in the center of the city, and

there are three colleges and several hospitals. Numerous and thriving bazaars, banks, and manufactories of muslins, carpets, pottery, brass work, and jewelry make the town an important industrial center. Its population is about 120,000.

Lahore, *lah hohr'*, is the capital and largest city of the Punjab. The native town is surrounded by a brick wall fifteen feet high. Its houses are of irregular construction, but many are rendered attractive by projecting balconies and lattice windows ornamented with varieties of carved woodwork. The sordid aspect of the city is relieved by a magnificent mosque, a mausoleum, and a royal palace dating from the early Mogul period. The European quarter, which lies outside the walls on the south, dates from 1849.

Coarse silks, cotton prints, carpets, vegetable oils, and candles are important articles of manufacture. The Punjab University, one of the most popular educational institutions in India, is the most important of several schools. Population, about 282,000.

Patna, *put' nah*, the capital of the province of Bihar and Orissa, is on the right bank of the Ganges River, 332 miles northwest of Calcutta. In commercial importance, it ranks next to the latter among the cities of Bengal. It was once one of the most important centers of the opium-poppy cultivation. It is widely known for its bazaars. Patna, including the suburbs, extends along the river bank for nine miles. This ancient city, with its narrow, crooked streets, has a long history, having flourished under the name of Lotus City four centuries before Christ. The population of 120,000 is chiefly Hindu, though there are many Mohammedans and a few Christians.

Poona, a city and district in Bombay Presidency, headquarters of the Bombay army and government each year from July to November, when the climate of Poona is more healthful than that of the surrounding district. The city stands 1,850 feet above sea level, near where the rivers Mutha and Mula meet. The city is supplied with water from the River Mula, an embankment and waterworks having been erected ten miles from the city. There are numerous educational institutions, including the Deccan College, established by the government, with European professors. Cotton mills, flour mills, and dairies represent the chief industries. Population, about 215,000.

Srinagar, *sre nah gur'*, or **Serinagar**, *se re' nuh gur'*, the capital city of Kashmir, lies near the lake made famous by Moore in his *Lalla Rookh*. This town is situated on the Jhelam River, 170 miles northeast of Lahore, in the lovely Vale of Kashmir. There are picturesque mountains in the background, and near by are beautiful gardens. The buildings present a curious combination of different forms of architecture. Srinagar is a center for rug-weaving and the manufacture of silver articles, attar of roses, paper, and leather. Population, about 142,000.

Simla lies in the province of the Punjab about 170 miles north of Delhi, and is the summer capital of British India. Because of its situation on a spur of the Himalaya Mountains, 7,000 feet above sea level, and its cool, healthful climate, the Viceroy of India and his assistants retire from the capital to Simla early in the summer. Simla is also popular with a great number of Europeans from all parts of India, who make it their temporary residence during the hot season. The town has many picturesque villas, churches, institutions, schools, hotels, clubs, and banks. Permanent population, about 15,000; summer population, about 35,000. See PUNJAB.

Surat, *soo rat'*, is situated in the province of Bombay, near the western coast, about 150 miles north of the city of Bombay. For two centuries, Surat was a city of great commercial importance, and was classed among the most popular cities of Asia, but it has declined since the English East India Company removed to Bombay. The Mohammedan mosque,

Parsee and Hindu temples, and a medieval castle prominent on the river front are among the chief points of interest. Textiles and small ornamental objects are manufactured, and cotton and grain are exported, and this is no small commercial asset to the city. A British military camp is stationed at Surat. Population, about 117,500.

The Land, Resources and Industries

Coasts. The coast line of the Indian peninsula is about 3,000 miles, and much of it is very regular, except where the mouths of the great rivers widen into broad deltas. On the west there are two prominent indentations, the Gulf of Cutch and the Gulf of Bombay, but on the east the breaks in the coast line are more gentle. To the southeast of the southern extremity is the large island of Ceylon, separated from the mainland by Palk Strait and the Gulf of Manar. A chain of small islands between the two is called Adam's Bridge.

Surface Features. India, excepting the wild and hilly region of Burma, which is treated in a separate article, is divided into three well-defined tracts. In the north is the Himalaya Mountain region, which contains the loftiest passes and peaks in the world, ranging from two to about five miles in height. Mount Everest, reaching a height of nearly five and a half miles, is the loftiest mountain on the earth. India would be a very different country were it not for this vast wall, which shuts off the cold winds from the bleak region to the north. The lower slopes are densely forested.

Next is the great plain of the Indus, Ganges, and Brahmaputra rivers. This broad, low valley region, stretching the full width of the peninsula, from the delta of the Indus at the head of the Arabian Sea to that of the Ganges and Brahmaputra on the Bay of Bengal, is subject to frequent floods. As Egypt is the "gift of the Nile," so is this most fertile region of India the gift of these three great rivers. This is the most densely populated part of the empire.

On the south this plain slopes gradually upward to meet the table-land of the Deccan, known as the hill country, which extends to the end of the peninsula. This region has an altitude of from 1,600 to 3,000 feet above sea level, rising along the western coast to an unbroken wall known as the Western Ghats, which drops from an altitude of 8,000 feet into the Indian Ocean. From these steep slopes the Deccan tilts eastward, being drained by numerous streams into the Bay of Bengal. Its surface is broken by numerous conical peaks, the craters of old volcanoes; for practically the whole Deccan table-land is but a heap of lava poured out in bygone days. This rugged country presents a variety of contrasts, with its dense forests, its bare, wind-swept hills, and its rich river valleys.

In the forests and jungles throughout all India, wild animals abound, and insects are innumerable, for religion prevents the people from taking the life of any living creature. Monstrous poisonous snakes are a fearful menace to the population. Deaths of natives from snakebite and wild beasts average many thousands every year.

Climate. From the snow-cloaked Himalayas to the tropical waters surrounding the tip of the peninsula, India is a land of widely varying climate, not only because of its great extent, but because of differing elevations. The southern portion and the lowland regions everywhere have a high temperature throughout the year, and in the summer months are unpleasantly hot. On the slopes of the Himalayas, however, and in the higher parts of the Deccan, the climate is delightful, and here have sprung up the "summer resorts" to which all Europeans who can do so find their way at the beginning of the hot weather. Most famous of these resort cities is Simla, celebrated by Kipling in a score or more of stories.

Of even greater importance than the temperature, however, is the rainfall, for upon the monsoons, or rain-bearing winds blowing in from the Indian Ocean, depends the very life of the people. There are but two seasons, a wet and a dry, the former lasting from June until November, the latter through the remaining months. Some regions of India, notably Assam, along the northern coast of the Bay of Bengal, receive the heaviest rainfall in the world, ranging from forty to sixty feet in a year. Some parts, on the other hand, are arid, and in the upper Bengal provinces, the lack of rain has caused those disastrous famines which once played so large a part in the economic history of India (see FAMINE).

Minerals. Time was when India was famous for its diamonds and its rubies, but to-day the output of its mines is far less gorgeous, though more practical; for coal is now its principal mineral product. The growth of coal-mining is recent, and has kept pace in a measure with the growth of railways and manufacturing, for it is chiefly to supply power that it is in demand. Petroleum is plentiful, and gold and manganese ore are found in the Deccan, but of other minerals the yield is small. What vast riches the Himalayan ranges may contain cannot even be conjectured.



Photos: U & U.

India Presents Scenes of Splendor. At left, the Golden Temple, sacred lake, and Clock Tower, in the city of Amritsar. At right, street leading to the beautiful palace of a powerful maharaja. This is a view in Udaipur, one of the little principalities in Central India Agency, south of Rajputana

Manufactures. The native inhabitants of India have always been famous for their skill in weaving exquisite and delicate fabrics, and their crude looms are still kept busy creating beautiful laces, rugs, carpets, and shawls. They are noted also for their metal work and carved woodwork, showing a delicacy and skill wonderful to Western eyes. The natives them-



A RULING PRINCE

The maharajas possess jewels of almost fabulous value, and these are worn on all state occasions.

selves, however, now make comparatively little use of the beautiful hand-wrought products, whether textile or metal, since the factory-made articles of England can be imported so cheaply.

Cotton mills are numerous, and the manufacture of cotton fabrics, such as calicoes, constitutes the most important industry. Jute, rice, and sugar mills are also common, and railway and engineering shops are increasing in the coal and iron region of Bengal. There are steel mills in operation which are among the most modern in the world.

Agriculture. But it is upon the soil of India that the great masses of the people have from time immemorial relied. Holding largely to their primitive methods, the natives have far smaller crops than might otherwise be the case, but the soil is for the most part fertile, and if the moisture is sufficient, it produces well. The rainfall is very uncertain, and with its failure have come those frightful famines which carried off thousands of people. Improvement in transportation facilities and the introduction of irrigation by the British govern-

ment form the most important measures in relieving the famine situation, which has now been almost conquered.

The government has constructed great reservoirs for irrigation purposes, not only in those sections like Sind and the lower Punjab, which must be irrigated every year, but in places which are liable to occasional drought. Altogether, at least one-sixth of the total area under crops is irrigated, and of this area, at least half is supplied with water from government projects.

In the delta regions and flood plains of the great rivers are extensive rice fields, providing one of the staple foodstuffs of India. Millet covers the second largest acreage. In the north-west provinces and on the irrigated areas of the Deccan are great wheat fields. The black soil of the Deccan and the regions about Bombay grow great areas of cotton; this is one of the world's greatest cotton-growing areas. In certain high regions in the United Provinces of Agra and Oudh, at the foot of the Himalayas, sugar cane is cultivated. Jute, tobacco, tea, indigo, and various oil seeds are also grown.

The Department of Agriculture has made some progress recently in the improvement of crops. But the natives are slow to accept modern machinery and implements, and still use the draft animal; the livestock consists, therefore, of cattle, oxen, buffalo, mules, camels, and elephants.

Forests, covering a quarter of the area of India, are filled with rich timbers such as sandalwood, teak, ironwood, and deodar.

Transportation and Commerce. All of the large cities are connected by railway lines, which run also into the famine districts and effectively bind together regions not long ago separated from each other. There is a total in India of over 38,000 miles of railway, and of this mileage, a large part is under the control of the government, either directly or through operating companies. Canals, too, are numerous, connecting certain of the rivers, and these, with the railways and the rivers themselves, give India, except in the interior mountain regions, better transportation facilities than any other country in Asia.

Long before it came under European influence, India had a flourishing trade, and it was for commercial advantage that the European peoples seized upon the country. To-day, it has a very large commerce, amounting to about a billion and a half dollars annually. Exports, which consist largely of cotton, rice, indigo, wood, opium, tea, coffee, wheat, hides, and jute, make up over half the total; while the chief imports are cotton goods, hardware and other manufactured articles, and foodstuffs. A large proportion of the trade is with Great Britain, but the United States, China,

Japan, the Straits Settlements, Germany, and France have been for some years well represented in India's trade. Exports from the United States to British India made a gain of twenty-seven per cent in the one year 1927. The balance of trade between India and the

rest of the world has been so favorable to that country that, after their meager requirements have been satisfied, the people have been burying in the ground for safe-keeping (they do not trust banks) as much as \$300,000,000 yearly for more than twenty years.

Government and History

Government. India is a dependency of the British Crown, the sovereign since 1876 being known as emperor of India. In the provinces of British India, that is, the portion of India directly annexed or otherwise acquired by the British Crown, the emperor is represented by a Governor-General over all, and a governor in each.

In native India, that is, in the states which since the beginning have been ruled by native governments under their own princes, the British Crown is represented by the Viceroy, who is always the same person as the Governor-General, and is known as "Viceroy and Governor-General of India." These states have treaties with the British Crown whereby the latter guarantees their internal independence on condition that their external relations are in the hands of the government of India. They are completely autonomous internally, and the law of the British provinces does not apply to them. They have practically all entered into a customs, postal, and monetary union with the government of India.

The Governor-General is the president of the governing Executive Council in British India, forming what is known as the Governor-General in Council. There is a Chamber of Princes to advise the Governor-General in Council on matters affecting the states; and for legislation, there are a Council of States and a Legislative Assembly elected by popular suffrage. The government of India deals with the main central functions of government, such as defense, foreign relations, etc., which in America would be dealt with by the Federal government. The British Parliament, having superseded the old East India Company, assumed responsibility for the good government of India. All changes in the Constitution of India must, therefore, emanate from it. Its agent is the Secretary of State for India, a member of the Cabinet in Great Britain, who corresponds directly, on behalf of Parliament, with the Viceroy and Governor-General.

In the provinces, the functions of government, which are under the Governor, are administered under two heads—transferred subjects, which are dealt with by Indian Ministers, and reserved subjects, which are dealt with by the Governor's Executive Council. The Ministers are responsible to the provincial legislatures, which are elected by popular suffrage. This system is known as diarchy.

A diplomatic representative of the Viceroy, known as a Resident, is accredited to the principal native states or groups of states.

Beginnings of History. Very hazy are the earliest accounts of the history of India, the Hindu writings claiming for the country an antiquity of many thousands of years. Just when the Hindus or Aryans came from the north-west mountain region and conquered the earliest inhabitants is not known, but it was probably about 2000 B.C. In the sixth century B.C. the Persians under Darius invaded India, and the next event of importance was the expedition of Alexander the Great into the country. The description of manners and customs given by his historians shows that the people changed remarkably little in the two thousand years before the modern European occupancy, the reason being that India has been almost completely isolated from the rest of the world because of its geographical location.

The Troubled Middle Period. All during the centuries known in European history as the ancient and medieval periods, India was in a constantly shifting condition. First one state, then another, would gain supremacy, and occasionally, conquerors from the outside would sweep over the country. The Mohammedans came and set up an empire; the Mongols under the great conqueror Timur, or Tamerlane, gained a firm hold; but never at any time was there any feeling of nationality developed, and the breaking up of the strong empire of the Moguls left the country an easy prey to the Europeans.

The Coming of the Europeans. The first to arrive were the Portuguese, who, early in the sixteenth century, seized some ports on the west coast, and by 1613 the English, too, had established themselves. Soon came the French, and between them and the English a rivalry sprang up. In 1744, while the two countries were at war in Europe, open hostilities broke out in India as well, but not until 1757, when Clive won the decisive Battle of Plassey, did the English East India Company become the dominant power in the peninsula. From that time, largely through the genius of Clive, the East India Company was paramount in India.

The British Empire. Next to Clive, the most famous of the early English administrators was Warren Hastings, who in 1774 was made first Governor-General of India. He it was who laid the foundations for the present system of

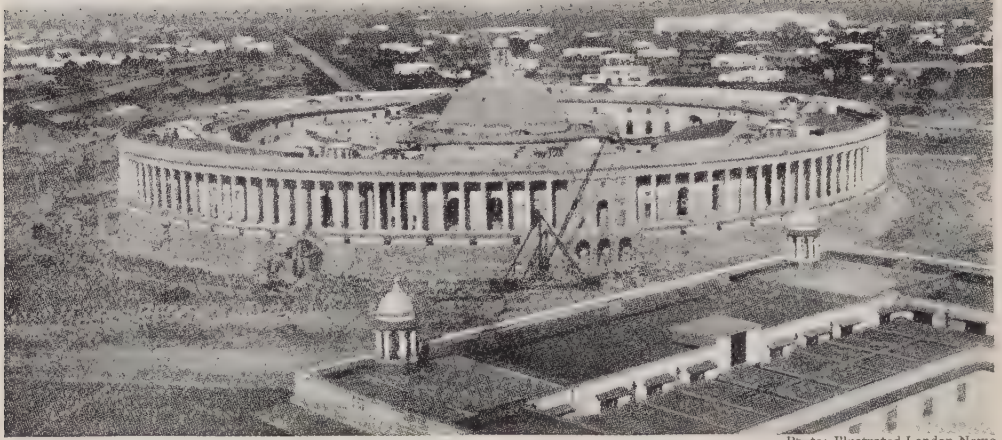


Photo: Illustrated London News

THE NEW CAPITOL AT DELHI

It contains three chambers for the Assembly, the Council of State, and the Council of Princes, with a domed Durbar Hall in the center (see DURBAR).

administration in the empire. Wars with native states were frequent, and in every one of them the British made some gain; and if at times the methods used were open to criticism, in many ways the people of India were benefited. Feeling that a "buffer state" was needed on the north to protect India from the invasions of foreign powers, Great Britain undertook the first Afghan War in 1839. Defeated in the early campaigns, the British forces were later successful, but ultimately Great Britain gave up its hold on Afghanistan, which is now independent.

A Great Crisis. In 1857 occurred the Sepoy Rebellion, the most impressive event in the history of British India. To the British the determining causes seemed small and unimportant—such superstitions as that which forbade the natives to bite the cartridges greased with the fat of the sacred cow and the despised pig; but to the natives themselves, they were real enough to dictate a very real rebellion. The events of this outbreak are treated in the article SEPOY REBELLION. Its effects were far-reaching, for it resulted in the transfer of the government of India from the East India Company (which see) to the Crown. Not until years later, in 1877, was the queen actually proclaimed empress of India.

The Last Half Century. Meanwhile, despite occasional native risings, famines, and problems manifold, there was marked progress in India, which was steadily becoming one of the most valuable colonies possessed by any European nation. The Afghan War of 1878-1880 was an unusually sharp conflict which resulted in the success of the British, and in 1885 the rich terri-

tory of Burma was annexed to British holdings. Another serious outbreak occurred on the Afghan frontier in 1897, but again the British were in the end victorious. Particularly distressing was the great famine of 1899, which caused untold suffering to millions of people, and the British acquired a hold on the affections of the people by their efforts to allay the distress. The attitude of Great Britain toward Tibet almost led to an open break with Russia, but in 1903 that difficult mountain country was in a measure opened up to trade with England by the spectacular expedition of Colonel Young-husband.

Not all classes in India are reconciled to British rule, and at intervals it has been necessary to put down risings which were inspired by men of the educated classes who dreamed of a free and self-governing India. In a manner the discontent was allayed by the appointment of Hindus to various offices, and the welcome which George V received on his visit to India, in December, 1911, was most enthusiastic, while the Durbar (which see), held to celebrate the crowning of the sovereign as emperor of India, was of unparalleled magnificence. During this visit of King George, the capital was transferred from Calcutta to Delhi, its permanent location.

At the outbreak of the World War, in 1914, India proved not different from the other British dependencies in its protestations of loyalty. It was the general opinion of the world that Germany thought the native states of India would revolt from Great Britain and thus lessen the latter's participation in the war. The native princes, however, offered men and



Photos: ORO G; U & U

Life in India Is Hard. At upper left, coolies are carrying very heavy loads, supported by lines around their foreheads. Their task is made harder, because they wear no shoes, so matter how rough the roads may be. Below, workers weaving dreams and imagination into rugs. At right, washday, anywhere in India

money, and very early in the fighting, Indian troops were rushed to France.

In 1921, under the direction of Mohandas Gandhi (which see), a movement for independence swept India. Its chief feature was the boycotting of British interests by a general policy of non-coöperation with the government. By 1930 the movement against English rule had reached formidable proportions. J. F. M'K.

Related Subjects. The following articles in these volumes will be interesting and helpful in connection with the study of India:

CITIES	
Bombay	Lucknow
Calcutta	Madras
Delhi	

COAST WATERS	
Arabian Sea	Indian Ocean
Bengal, Bay of	

DIVISIONS	
Bengal	Nepal
Bombay	Punjab
Burma	Rajputana

HISTORY	
Afghanistan (History)	Sepoy Rebellion
Black Hole of Calcutta	Suttee
Clive, Robert	Tibet
Hastings, Warren	Timur

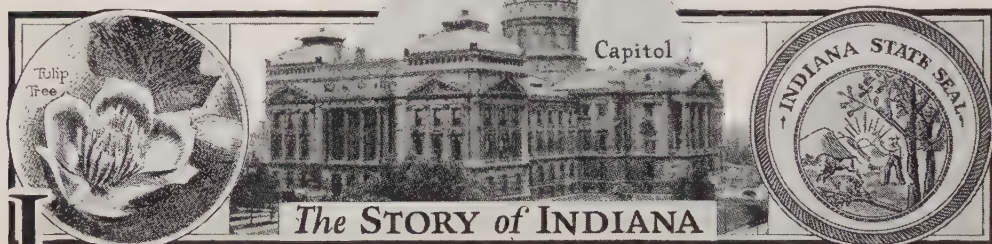
LEADING PRODUCTS	
Coal	Opium
Coffee	Rice
Cotton	Wheat
Indigo	

RELIGION	
Brahmanism	Caste
Buddhism	Mohammedanism

RIVERS	
Brahmaputra	Nerbudda
Ganges	Sutlej
Indus	

UNCLASSIFIED	
Bengali	Himalaya
Durbar	Hindustan
Fakir	Laccadive Islands
Gandhi, Mohandas	Sikhs

INDIA INK. See INK.



INDIANA, one of the north-central states of the American Union, is popularly known as the HOOSIER STATE. The origin of this nickname, which is used far more commonly than the popular names of most other states, no one knows, although many humorous stories are circulated to account for it. As its state flower emblem, Indiana has chosen the flower of the tulip tree. Its state song, "On the Banks of the Wabash," has immortalized that river.

Size and Location. Indiana is almost twice as long, north and south, as it is wide, its greatest length being about 275 miles and its greatest breadth 143 miles. Its land-and-water area of 36,354 square miles makes it thirty-seventh in size among the states of the Union; it is, however, larger than all the New England states combined, excluding Maine.

The center of population of the United States is in the western part of the southern half of Indiana. Though popularly called a Middle Western state, Indiana is far east of the geographical center of the country. It is just about at the center of the eastern half of the United States. On the north it is bounded by Michigan and, for a distance of about sixty miles, by the southern shore of Lake Michigan; on the east by Ohio; on the south by Kentucky,

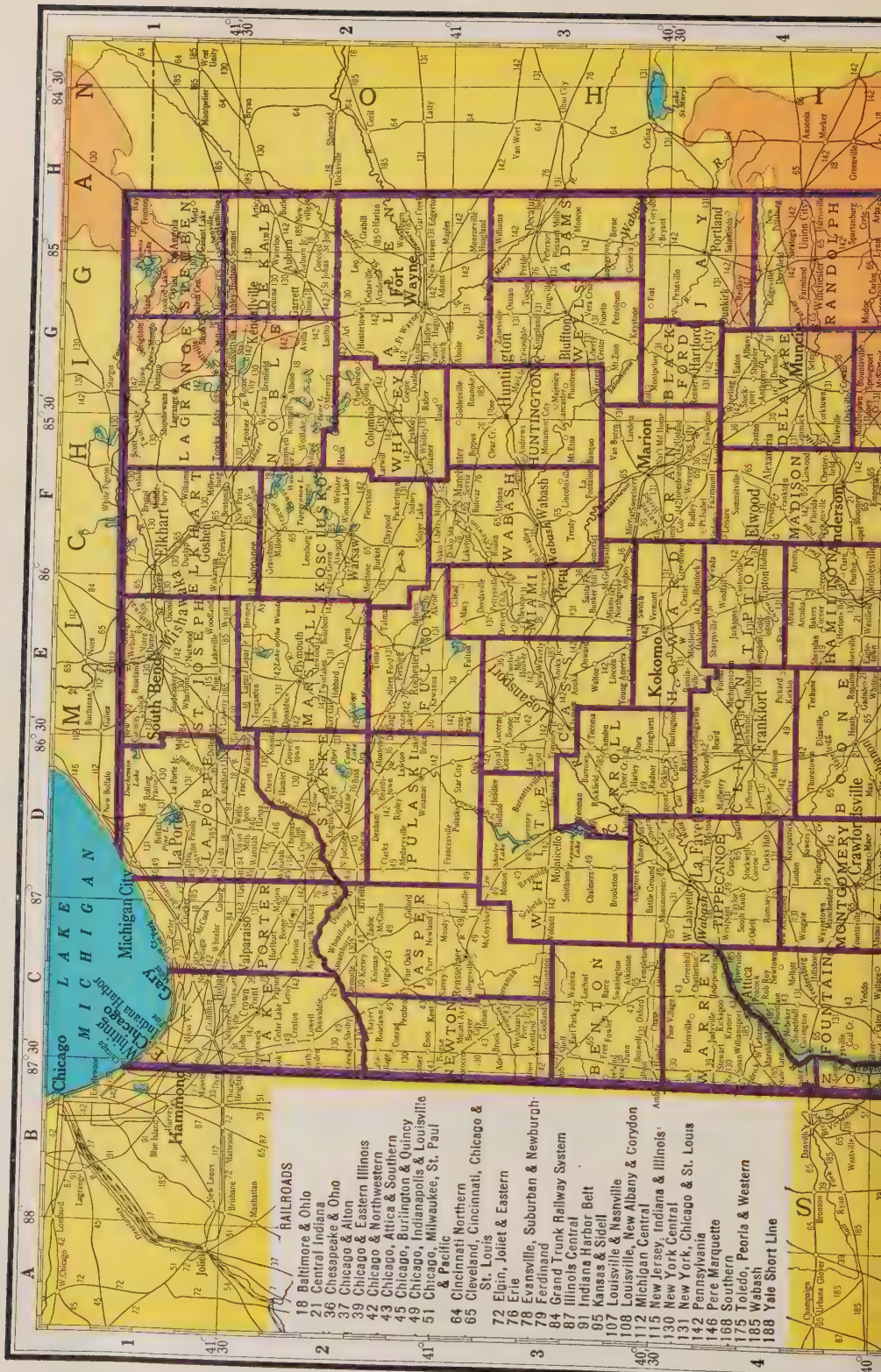
from which it is separated by the Ohio River; and on the west by Illinois, the Wabash River forming the southern part of the boundary between these two states. About 300 square miles of its area are water surface, more being in rivers than in lakes.

The People. The term "Hoosiers" was long a term of mild derision, but Indiana folk have proved so capable and so progressive that they have earned the right to be proud of the name. In fact, Indiana has produced more than its share of the popular writers—Lew Wallace, James Whitcomb Riley, Maurice Thompson, George Ade, George B. McCutcheon, Charles Major, Meredith Nicholson, Booth Tarkington, and others,—giving rise to the saying, "Every Hoosier is born with a pen in his hand."

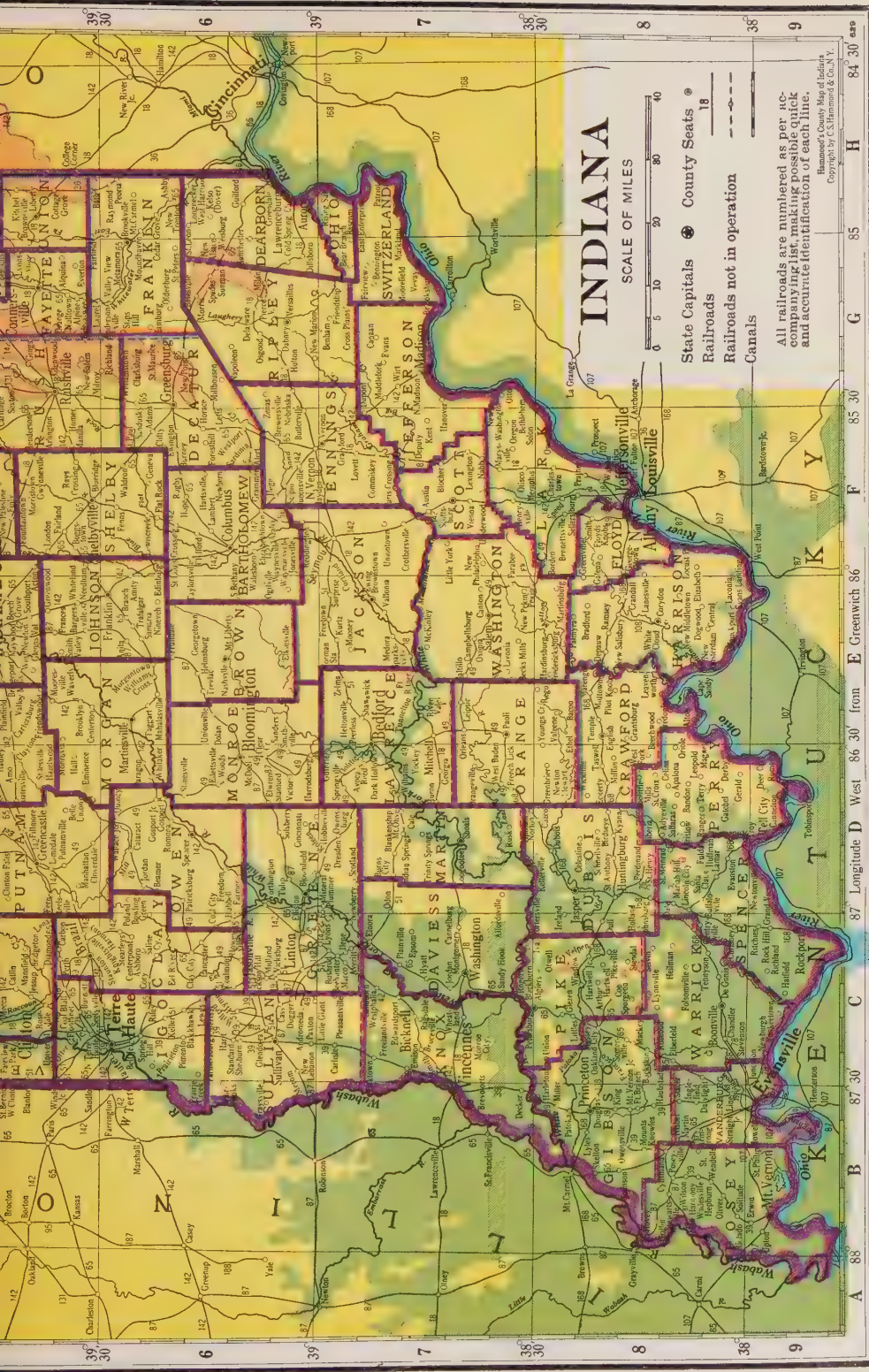
The state had 2,930,390 inhabitants in 1920, and ranked eleventh among the states in population. A hundred years earlier, the population was 147,178. Especially noteworthy is the relatively small proportion of foreigners; only 5.3 per cent of the people are foreign-born, one-fourth of whom are Germans, the remainder Polish, Hungarian, Austrian, English, Russian, Irish, and others less numerous. The average number of people to the square mile was 81.3 in 1920, as compared with 35.5 for the entire United States. Half of the popula-

INDIANA

Acton, (E5).....	400	Bryant, (H3).....	428	Culver, (E2).....	1,080	Francesville, (D3).....	648	Huron, (D7).....	176
Adams, (F6).....	150	Buck Creek, (D4).....	200	Cumberland, (E5).....	500	Francisco, (E8).....	614	Hymera, (G4).....	1,599
Advance, (D5).....	417	Buffalo, (D3).....	150	Curtisville, (F4).....	150	Frankfort, (C4).....	11,585	Idaville, (D3).....	300
Aetna, (C1).....	42	Buffaloville, (D8).....	150	Cutler, (D4).....	200	Franklin, (E6).....	4,909	Indiana Harbor,	
Ainsworth, (C2).....	200	Bunker Hill, (E3).....	550	Cynthiana, (B8).....	568	Frankton, (F4).....	739	(C1).....	7,000
Akron, (E2).....	930	Burket, (F2).....	200	Dale, (D8).....	688	Fredericksburg, (E8).....	215	INDIANAPOLIS	
Alamo, (C5).....	167	Burlington, (E4).....	500	Daleville, (F4).....	500	Freedom, (D6).....	250	(E5).....	314,194
Albany, (G4).....	1,333	Burnett, (C5).....	200	Dana, (C5).....	884	Freeland Park, (C3).....	250	Indian Springs, (D7).....	200
Albion, (G2).....	1,142	Burnettsville, (D3).....	517	Danville, (E5).....	1,729	Freelandville, (C7).....	500	Ingalls, (F5).....	399
Alert, (F6).....	250	Burney, (F6).....	200	Darlington, (D4).....	823	Freetown, (E7).....	400	Inglefield, (B8).....	150
Alexandria, (F4).....	4,172	Burns City, (D7).....	200	Davis, (D2).....	150	Fremont, (H1).....	729	Ireland, (D8).....	150
Alfordsville, (C7).....	200	Burr Oak, (E2).....	150	Dayton, (D4).....	250	French Lick, (D7).....	1,980	Jackson Hill, (C6).....	300
Alziers, (C8).....	150	Burrows, (D3).....	200	Decatur, (H3).....	4,762	Friendship, (G7).....	250	Jamestown, (D5).....	628
Alton, (E8).....	128	Butler, (H2).....	1,745	Decker, (B7).....	300	Fulda, (D8).....	200	Jasonville, (C6).....	4,461
Altona, (G2).....	382	Butler, (F6).....	300	Deedsville, (E3).....	200	Fulton, (E3).....	361	Jasper, (D8).....	2,539
Ambia, (B4).....	459	Cadiz, (F5).....	148	Delaware, (G6).....	200	Galveston, (E3).....	691	Jeffersonville, (F8).....	10,098
Amboy, (F3).....	460	Cambridge City,		Delong, (E2).....	300	Garrett, (G2).....	4,796	Jolietville, (E4).....	150
Amo, (D5).....	274	(G5).....	1,963	Delphi, (D3).....	2,087	Gary, (C1).....	55,378	Jonesboro, (F4).....	1,429
Anderson, (F4).....	29,767	Camden, (E3).....	597	Demotte, (C2).....	300	Gas City, (F4).....	2,870	Jonesville, (F6).....	213
Andersonville, (G6).....	200	Cammack, (F4).....	150	Denham, (D2).....	150	Gaston, (F4).....	541	Judson, (C5).....	163
Andrews, (F3).....	1,071	Campbellsburg, (E7).....	659	Denver, (E3).....	522	Geneva, (G3).....	879	Judyville, (C4).....	150
Angola, (H1).....	2,650	Canaan, (G7).....	250	Depauw, (E8).....	250	Gentryville, (C8).....	291	Kempton, (E4).....	498
Arcadia, (E4).....	1,060	Cannelburg, (C7).....	224	Deputy, (F7).....	350	Georgetown, (F8).....	401	Kendallville, (G2).....	5,273
Arcola, (G2).....	250	Cannelton, (D9).....	2,008	Derby, (D8).....	150	Glenwood, (G5).....	324	Kennard, (F5).....	541
Argos, (E2).....	1,111	Carbon, (C5).....	572	Diamond, (C5).....	352	Goldsmith, (E4).....	300	Kent, (F7).....	200
Arlington, (F5).....	300	Carlisle, (C7).....	973	Dillsboro, (G6).....	471	Goodland, (C3).....	1,120	Kentland, (C3).....	1,283
Ashley, (G1).....	618	Carlos, (G4).....	200	Disko, (F2).....	150	Goshen, (F1).....	9,525	Kewanna, (E2).....	695
Atlanta, (G1).....	678	Carmel, (E5).....	598	Dover, (H6).....	150	Gosport, (D6).....	700	Keystone, (G3).....	150
Attica, (C4).....	3,392	Cartersburg, (E5).....	200	Dublin, (G5).....	630	Grabill, (H2).....	250	Kimmell, (F2).....	250
Atwood, (F2).....	200	Carthage, (F5).....	902	Dubois, (D8).....	300	Grammer, (F6).....	200	Kingman, (C5).....	578
Auburn, (G2).....	4,650	Cass, (C6).....	150	Dugger, (C6).....	1,679	Grand View, (D9).....	689	Kirklin, (E4).....	695
Aurora, (H6).....	4,299	Castleton, (E5).....	208	Dune Park, (C1).....	150	Granger, (E1).....	200	Knightstown, (F5).....	1,918
Austin, (F7).....	300	Cates, (C5).....	150	Dunkirk, (G4).....	2,532	Grasscreek, (E3).....	150	Knightsville, (C6).....	767
Avilla, (G2).....	537	Catlin, (G5).....	200	Dunn, (C3).....	150	Greencastle, (D5).....	3,780	Knox, (D2).....	1,577
Avoca, (D7).....	150	Cayuga, (C5).....	933	Dunreith, (G5).....	184	Greendale, (H6).....	763	Kokomo, (E3).....	30,667
Bainbridge, (D5).....	475	Cedar Grove, (H6).....	200	Dupont, (G7).....	300	Greenfield, (F5).....	4,168	Koleen, (D6).....	150
Bargersville, (E5).....	290	Cedar Lake, (C2).....	600	Dyer, (B1).....	479	Greensboro, (F5).....	229	Kouts, (C2).....	650
Bascom, (H7).....	150	Celestine, (D8).....	150	Earl Park, (C3).....	542	Greensburg, (G6).....	5,345	Kramer, (F4).....	200
Bass, (D2).....	200	Center, (E4).....	200	East Chicago, (C1).....	35,967	Greens Fork, (G5).....	380	Kurtz, (E7).....	150
Batesville, (G6).....	2,361	Centerpoint, (C6).....	371	East Connorsville,		Greentown, (F4).....	1,163	Kyana, (D8).....	150
Bath, (H5).....	250	Centerville, (G5).....	917	(G5).....	945	Greenville, (F8).....	225	Laconia, (E8).....	83
Battle Ground, (D3).....	444	Chalmers, (D3).....	528	East Enterprise, (H7).....	250	Greenwood, (E5).....	1,907	LaCrosse, (D2).....	500
Bedford, (E7).....	9,076	Chandler, (C8).....	300	East Gary, (C1).....	813	Griffin, (B8).....	341	Ladoga, (D5).....	1,010
Beech Grove, (E5).....	1,459	Charlestown, (F8).....	820	East Germantown,		Griffith, (C1).....	630	La Fayette, (D4).....	22,486
Belle Union, (D5).....	150	Charlotteville, (F5).....	250	(G5).....	267	Guilford, (H6).....	250	La Fontaine, (F3).....	601
Belleville, (D5).....	150	Chesterfield, (F4).....	319	Eaton, (G4).....	1,214	Gwynneville, (F5).....	300	Lagrange, (G1).....	1,610
Bellmore, (C5).....	300	Chesterton, (D1).....	1,604	Ekerty, (D8).....	250	Hagerstown, (G5).....	1,238	Lagro, (F3).....	515
Ben Davis, (E5).....	300	Chili, (E3).....	150	Economy, (G5).....	300	Hamilton, (H1).....	387	Lafayette, (F3).....	300
Benham, (G7).....	150	Chrisney, (C8).....	495	Edinburg, (E6).....	2,376	Hamlet, (D2).....	480	Lakeville, (E1).....	333
Bennetts Switch,		Churubusco, (G2).....	916	Edwardsport, (C7).....	400	Hammond, (B1).....	36,004	Landess, (F3).....	200
(E3).....	200	Cicero, (F4).....	906	Effner, (C3).....	150	Hanna, (D2).....	400	Lanesville, (E8).....	269
Benton, (F1).....	200	Clarksburg, (G6).....	400	Elberfeld, (C8).....	473	Hanover, (F7).....	360	Laotto, (G2).....	300
Berne, (H3).....	1,537	Clarks Hill, (D4).....	435	Elizabeth, (E8).....	193	Hardsburg, (E8).....	253	Lapaz, (E2).....	274
Bethlehem, (F7).....	150	Clarksville, (F8).....	2,322	Elizabethtown, (F6).....	313	Harlan, (H2).....	400	Lapel, (F4).....	1,079
Bicknell, (C7).....	7,635	Clay City, (C6).....	1,226	Elkhart, (F1).....	24,277	Harmony, (C6).....	200	La Porte, (D1).....	15,158
Bippus, (F3).....	300	Claypool, (F2).....	356	Ellettsville, (D6).....	721	Harrisville, (H4).....	150	Larwill, (F2).....	264
Birdseye, (D8).....	527	Claysburg, (F8).....	437	Elmore, (C7).....	865	Harrodsburg, (D6).....	200	Laud, (G2).....	150
Blackhawk, (C6).....	150	Clayton, (D5).....	493	Elwood, (F4).....	10,790	Hartford City, (G4).....	6,183	Laurel, (G5).....	515
Blanford, (B5).....	500	Clear Springs, (E7).....	200	Elwren, (D6).....	200	Hartsville, (F6).....	284	Lawrence, (E5).....	500
Bloomfield, (D6).....	1,872	Clermont, (E5).....	240	Eminence, (D5).....	150	Hartwell, (C8).....	300	Lawrenceburg, (H6).....	3,466
Bloomington, (E6).....	11,595	Cleveland, (F5).....	150	English, (E8).....	576	Hatfield, (C9).....	200	Leavenworth, (E8).....	611
Blossville, (G4).....	153	Clifford, (F6).....	185	Etna Green, (F2).....	357	Haubstadt, (B8).....	600	Lebanon, (D5).....	6,257
Bluebridge, (F5).....	150	Clinton, (C5).....	10,962	Evansville, (C9).....	85,264	Hayden, (F6).....	150	Leesburg, (F2).....	369
Bluffton, (G3).....	5,391	Cloverdale, (D5).....	678	Everson, (G5).....	150	Haysville, (D8).....	150	Leipsic, (E7).....	200
Boggs, (F5).....	200	Clymers, (E3).....	150	Ewing, (E7).....	500	Hazelwood, (D5).....	150	Leiters Ford, (E2).....	350
Boone Grove, (C2).....	150	Coal Bluff, (C5).....	150	Fairbanks, (B6).....	200	Hazleton, (B8).....	605	Lena, (C5).....	350
Booneville, (C8).....	4,451	Coal City, (D6).....	350	Fairland, (F5).....	450	Hebron, (C2).....	832	Leo, (G2).....	150
Borden, (H5).....	450	Coalmont, (C6).....	300	Fairmount, (F4).....	2,155	Hecla, (F2).....	200	Leopold, (D8).....	400
Boston, (F8).....	190	Coatesville, (D5).....	522	Fair Oaks, (C2).....	350	Helmer, (G1).....	250	Leroy, (C2).....	200
Boswell, (C3).....	880	Coesse, (G2).....	250	Farmersburg, (C6).....	1,141	Helmshurg, (E6).....	200	Lewis, (C6).....	300
Bourbon, (E2).....	1,259	Colburn, (D3).....	150	Farmer, (D6).....	150	Heltonville, (E7).....	300	Lewisville, (G5).....	460
Bowling Green, (D6).....	273	Colfax, (D4).....	793	Farmersburg, (C6).....	1,141	Hemlock, (F4).....	250	Lexington, (F7).....	300
Brazil, (C5).....	9,293	College Park, (G3).....	169	Farmland, (G4).....	878	Henryville, (F7).....	600	Liberty, (H5).....	1,292
Bremen, (E2).....	2,084	Columbia City,		Fayette, (E5).....	150	Herbst, (F3).....	200	Liberty Center, (C3).....	200
Brewersville, (F6).....	150	(F2).....	3,499	Ferdinand, (D8).....	884	Hessville, (C1).....	1,480	Liberty Mills, (F2).....	150
Bridgeport, (E5).....	400	Columbus, (F6).....	8,990	Fillmore, (D5).....	250	Hibbard, (E2).....	200	Ligonier, (F2).....	2,037
Bridgeton, (C5).....	250	Commiskey, (F7).....	150	Fincastle, (D5).....	150	Highland, (C1).....	542	Lincoln City, (D8).....	150
Briarfield, (G2).....	250	Connorsville, (G5).....	9,901	Fishers, (F5).....	142	Hillisburg, (E4).....	200	Linden, (D4).....	555
Bringinghurst, (E3).....	300	Converse, (F3).....	1,049	Flat Rock, (F6).....	400	Hillsboro, (C4).....	537	Linggrove, (G3).....	250
Bristol, (F1).....	568	Cortland, (F7).....	150	Flora, (E3).....	1,441	Hillsdale, (C5).....	250	Linsburg, (D5).....	150
Bristow, (D8).....	150	Corunna, (G2).....	272	Florence, (H7).....	250	Hoagland, (H3).....	250	Linton, (C6).....	5,856
Broad Ripple, (E5).....	1,552	Cory, (C6).....	250	Floyds Knobs, (F8).....	300	Hobart, (C1).....	3,450	Linnwood, (F4).....	150
Brownson, (G4).....	321	Corydon, (E8).....	1,785	Folsomville, (C8).....	150	Hobbs, (F4).....	150	Littles, (C8).....	350
Brook, (C3).....	975	Covington, (C4).....	1,945	Fontanet, (C5).....	250	Holland, (C8).....	350	Little York, (F7).....	180
Brooklyn, (E5).....	528	Cowan, (G4).....	150	Foresman, (C3).....	150	Holton, (G6).....	350	Livonia, (E7).....	176
Brooksgrove, (G7).....	117	Craigville, (G3).....	250	Forest, (E4).....	300	Homer, (F5).....	150	Lizton, (D5).....	182
Brookston, (D3).....	815	Crandall, (E8).....	133	Foresthill, (F6).....	113	Honey Creek, (G4).....	250	Lochiel, (C3).....	150
Brookville, (H6).....	2,220	Crawfordsville,		Fort Branch, (B8).....	1,339	Hope, (F6).....	1,183	Logansport, (E3).....	21,626
Brownsburg, (E5).....	1,063	(D4).....	10,139	Fortville, (F5).....	1,213	Howe, (G1).....	450	London, (F5).....	200
Brownstown, (F7).....	1,554	Cromwell, (F2).....	420	Fort Wayne, (G2).....	86,549	Howell, (B9).....	2,180	Longootte, (D7).....	2,335
Browns Valley, (D5).....	150	Crooked Lake, (G1).....	200	Fountain City, (H5).....	375	Hudson, (G1).....	385	Losantville, (G4).....	250
Brownsville, (H5).....	300	Cross Plains, (G7).....	200	Fountaintown, (F5).....	250	Huntertown, (G2).....	300	Lowell, (C2).....	1,197
Bruceville, (C7).....	400	Crothersville, (F7).....	1,131	Fowler, (C3).....	1,442	Huntingburg, (D8).....	3,261	Lucerne, (E3).....	250
		Crown Point, (C2).....	3,232	Fowlerton, (F4).....	225	Huntington, (G3).....	14,000	Lyford, (C5).....	150

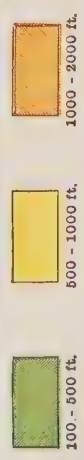


- RAILROADS**
- 18 Baltimore & Ohio
 - 21 Central Indiana
 - 36 Chesapeake & Ohio
 - 37 Chicago & Alton
 - 39 Chicago & Eastern Illinois
 - 42 Chicago & Northwestern
 - 43 Chicago, Atchafalaya & Southern
 - 45 Chicago, Burlington & Quincy
 - 49 Chicago, Indianapolis & Louisville
 - 51 Chicago, Milwaukee, St. Paul & Pacific
 - 64 Cincinnati Northern
 - 65 Cleveland, Cincinnati, Chicago & St. Louis
 - 72 Elgin, Joliet & Eastern
 - 76 Erie
 - 78 Evansville, Suburban & Newburgh
 - 79 Ferdinand
 - 84 Grand Trunk Railway System
 - 87 Illinois Central
 - 91 Indiana Harbor Belt
 - 95 Kansas & Sidel
 - 107 Louisville & Nashville
 - 108 Louisville, New Albany & Corydon
 - 112 Michigan Central
 - 115 New Jersey, Indiana & Illinois
 - 130 New York Central
 - 142 Pennsylvania
 - 146 Pere Marquette
 - 168 Southern
 - 175 Toledo, Peoria & Western
 - 185 Wabash
 - 188 Yale Short Line



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How to Read a Map: See page xvi, facing text page 1.



State Capitals ● County Seats ●
Railroads ———
Railroads not in operation - - - -
Canals ———

All railroads are numbered as per accompanying list, making possible quick and accurate identification of each line.

Hammel's County Map of Indiana
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INDIANA Continued

Lynn, (H4).....	898	Napoleon, (G6)...	450	Patrickburg, (D6)	250	Sandborn, (C7)...	530	Union, (C8).....	150
Lynnville, (C8)...	412	Nappanee, (F2)...	2,678	Patriot, (H7).....	289	Sandford, (B5)...	200	Union City, (H4)...	3,406
Lyons, (C7).....	894	Nashville, (E6)...	323	Paxton, (C6).....	200	San Pierre, (D2)...	300	Uniondale, (G3)...	257
McCordsville, (F5)	250	National Military		Pembroke, (C2)...	600	Saratoga, (H4)...	327	Union Mills, (D2)...	250
Mace, (D4).....	150	Home, (F3).....	2,300	Pence, (C4).....	250	Sardinia, (F6).....	150	Unionville, (E6)...	150
Macy, (E3).....	297	Nebraska, (F6)...	150	Pendleton, (F5)...	1,244	Schererville, (C2)...	483	Universal, (C5)...	1,570
Madison, (G7)...	6,711	Needham, (E5)...	200	Pennville, (G4)...	646	Schneider, (C2)...	258	University Heights,	
Mahalsville, (E6)...	250	New Albany, (F8)...	22,992	Perkinsville, (F4)...	200	Schnellville, (D8)...	250	(C5).....	477
Manilla, (F5)...	300	New Alsaace, (G6)...	200	Perryville, (C4)...	650	Scipio, (F6).....	200	Upland, (F4).....	1,301
Marco, (C7).....	250	New Amsterdam,		Pershing, (G5)...	400	Scircleville, (E4)...	200	Upton, (B9).....	250
Marengo, (E8)...	747	(E8).....	137	Perth, (C5).....	400	Scotland, (D7)...	200	Urbana, (B3).....	350
Marion, (F3)...	23,747	New Augusta, (E5)	400	Peru, (E3).....	12,410	Scottsburg, (F7)...	1,609	Utica, (E8).....	200
Markland, (G7)...	200	Newberry, (D7)...	439	Petersburg, (C7)...	2,367	Sedalia, (D4).....	250	Valeene, (F8)...	200
Markle, (G3)...	717	Newburgh, (C9)...	1,295	Philadelphia, (F5)...	200	Seelyville, (C5)...	915	Vallonia, (E7)...	400
Marionville, (F5)...	300	New Carlisle, (E1)	609	Piercetown, (F2)...	1,018	Sellersburg, (F8)...	915	Valparaiso, (C2)...	6,518
Marshall, (C5)...	334	Newcastle, (G5)...	14,458	Pierceville, (G6)...	150	Selma, (G4).....	318	Van Buren, (F3)...	861
Martinsville, (E6)...	4,895	New Chicago, (C1)	300	Pimento, (C6)...	200	Servia, (F3).....	200	Veedersburg, (C4)...	1,580
Marts, (C6).....	150	New Corydon, (H3)	300	Pine Village, (C4)...	301	Seymour, (F7)...	7,348	Velpen, (C8)...	150
Marysville, (F7)...	200	New Goshen, (C5)...	200	Pittsboro, (E5)...	549	Sharpsville, (E4)...	1,814	Vera Cruz, (G3)...	113
Matthews, (F4)...	502	New Harmony,		Plainfield, (E5)...	1,373	Shelburn, (C6)...	250	Vernon, (F7)...	423
Mauckport, (E8)...	239	(B8).....	1,126	Plainville, (C7)...	300	Shelby, (C2).....	250	Versailles, (G6)...	413
Maxwell, (F5)...	200	New Haven, (G2)...	1,237	Pleasant Lake, (H1)	600	Shelbyville, (F5)...	9,701	Vevay, (G7).....	1,175
Mays, (G5).....	250	New Lisbon, (G5)...	300	Pleasant Mills, (H3)	150	Sheridan, (E4)...	1,761	Vincennes, (C7)...	17,160
Maywood, (E5)...	300	New London, (E4)	150	Pleasantville, (C7)...	300	Shipshewana, (F1)...	248	Wabash, (F3).....	9,872
Mecca, (C5).....	500	New Marion, (G6)	200	Plymouth, (E2)...	4,338	Shirley, (F5).....	1,079	Wadesville, (B8)...	500
Medaryville, (D2)...	624	New Market, (D5)	403	Poland, (D6).....	200	Shirley City, (H2)...	474	Wakarusa, (F1)...	816
Medora, (E7)...	659	New Middletown,		Poneto, (G3).....	270	Shoals, (D7).....	1,034	Waldron, (F6)...	600
Mellott, (C4)...	340	(E8).....	119	Porter, (C1).....	699	Sidney, (F2).....	223	Walkerton, (D2)...	1,031
Memphis, (F7)...	200	New Palestine, (F5)	442	Port Fulton, (F8)...	971	Silver Lake, (F2)...	452	Wallace, (C5)...	111
Mentone, (F2)...	678	New Paris, (F2)...	500	Portland, (H4)...	5,958	Sims, (F4).....	200	Walton, (E3)...	713
Merom, (C6).....	503	New Pekin, (E7)...	356	Posyville, (B8)...	881	Smithville, (E6)...	300	Wanatah, (D2)...	650
Merriam, (G2)...	200	New Philadelphia,		Prairie Creek, (B6)	300	Solsberry, (D6)...	250	Warren, (G3)...	1,520
Metamora, (G6)...	300	(F7).....	150	Prairieton, (C6)...	200	Somerset, (F3)...	200	Warsaw, (F2)...	5,478
Metz, (H1).....	200	New Point, (G6)...	317	Preble, (G3).....	150	Somerville, (C8)...	350	Washington, (C7)...	8,743
Mexico, (E3)...	300	Newport, (C5)...	703	Princeton, (B8)...	7,132	South Bend, (E1)...	70,983	Waterloo, (H2)...	1,172
Miami, (E3)...	200	New Providence,		Plaski, (D3)...	150	South Milford, (G1)	350	Waveland, (D5)...	590
Michigan City,		(F8).....	333	Putnamville, (D5)...	150	Southport, (E5)...	458	Wawaka, (G2)...	200
(C1).....	19,457	New Richmond, (D4)	436	Quincy, (D6).....	200	South Whitley, (F2)...	1,074	Waynetown, (C4)...	691
Michigantown, (E4)	430	New Ross, (D5)...	351	Raleigh, (G5)...	200	Sparksville, (E7)...	150	Weisburg, (H6)...	150
Middlebury, (F1)...	599	New Salem, (G5)...	200	Ramsey, (E8)...	300	Spartanburg, (H4)...	200	West Baden, (D7)...	832
Middletown, (G4)...	1,273	New Salisbury, (E8)	250	Ravenswood, (E5)...	5	Spencer, (D6)...	2,066	West College Corner,	
Midland, (C6)...	300	Newtonville, (D9)...	150	Ray, (H1).....	250	Spencerville, (H2)...	350	(H5).....	439
Milan, (G6).....	718	Newtown, (C4)...	329	Reddington, (F6)...	150	Spiceland, (G5)...	632	Westfield, (E4)...	574
Milford, Decatur		New Trenton, (H6)	200	Redkey, (G4)...	1,386	Spring Grove, (H5)	76	West Fork, (D8)...	200
Co., (F6).....	139	New Washington,		Reelsville, (D5)...	250	Springport, (G4)...	139	West Harrison, (H6)	258
Milford, Kosciusko		(F7).....	300	Remington, (C3)...	1,044	Springville, (D7)...	200	West Lafayette,	
Co., (F2).....	811	New Waverly, (E3)	150	Rensselaer, (C3)...	2,912	Spurgeon, (C8)...	350	(D4).....	3,830
Miller, (C1).....	600	Nineveh, (E6)...	150	Reynolds, (D3)...	379	Star City, (D3)...	500	West Lebanon, (C4)	637
Millersburg, (F1)...	385	Noblesville, (F4)...	4,758	Richland, (C9)...	400	State Line, (C4)...	178	West Middletown,	
Millgrove, (G4)...	200	Norman Station, (E7)	200	Richmond, (H5)...	26,765	Staunton, (C6)...	642	(E4).....	150
Millhouses, (G6)...	165	Northgrove, (E3)...	130	Richvalley, (F3)...	150	Stendal, (C8)...	200	West Newton, (E5)	200
Milltown, (E8)...	615	North Judson, (D2)	1,189	Ridgeview, (E3)...	477	Stewartsville, (B8)	200	Westphalia, (C7)...	150
Millville, (G5)...	150	North Liberty, (E1)	684	Ridgeville, (G4)...	1,042	Stilesville, (D5)...	400	Westpoint, (C4)...	200
Milroy, (G5)...	650	North Madison, (G7)	309	Rigdon, (F4).....	150	Stillwell, (D1)...	150	Westport, (F6)...	709
Milton, (G5)...	580	North Manchester,		Riley, (C6).....	500	Stinesville, (D6)...	299	West Terre Haute,	
Mineral, (D7)...	150	(F3).....	2,711	Rising Sun, (H7)...	1,411	Stockwell, (D4)...	300	(C6).....	4,310
Mishawaka, (E1)...	15,195	North Salem, (D5)	595	Roadchade, (D5)...	876	Straughn, (G5)...	261	Westville, (D1)...	408
Mitchell, (D7)...	3,025	North Terre Haute,		Roann, (F3).....	414	Stroh, (G1).....	350	Westfield, (C2)...	382
Modoc, (G4).....	256	(C5).....	450	Ronoke, (G3)...	760	Sullivan, (C6)...	4,489	Wheatland, (C7)...	400
Mohawk, (F5)...	200	North Vernon, (F6)	3,084	Roan, (C1).....	200	Sulphur Springs, (F5)	202	Wheeler, (C1)...	150
Mongo, (G1).....	200	North Webster, (F2)	500	Rochester, (E2)...	3,720	Summitville, (F4)...	1,001	Whiteland, (E5)...	388
Monon, (D3)...	1,357	Notre Dame, (E1)...	1,200	Rockfield, (D3)...	250	Sunman, (G6)...	372	Whitestown, (E4)...	500
Monroe, (H3)...	384	Oakford, (E4).....	150	Rockport, (C9)...	2,581	Swanington, (C3)...	150	White Water, (H5)	96
Monroe City, (C7)	530	Oakland City, (C8)	2,270	Rockville, (C5)...	1,968	Swayzee, (F3)...	650	Whiting, (C1)...	10,145
Monroeville, (H3)...	864	Oaklandton, (E5)...	350	Roll, (G3).....	150	Sweetser, (F3)...	400	Wilkinson, (F5)...	324
Monrovia, (D5)...	350	Oaktown, (C7)...	779	Rolling Prairie, (D1)	250	Switz City, (C7)...	400	Williams, (D7)...	250
Monterey, (D2)...	304	Oakville, (G4)...	150	Rome, (D9).....	150	Syracuse, (F2)...	1,171	Williamsburg, (G5)	300
Montezuma, (C5)...	1,178	Ockley, (D4).....	150	Rome City, (G2)...	400	Tab, (C4).....	150	Williamsport, (C4)	1,088
Montgomery, (C7)	576	Odin, (D7).....	985	Romey, (D4)...	200	Talma, (E2).....	150	Willow Branch, (F5)	150
Motticello, (D3)...	2,536	Oldenburg, (G6)...	628	Rosedale, (C5)...	741	Tangier, (C5)...	150	Winamac, (D2)...	1,684
Montmorenci, (D4)	200	Onward, (E3)...	250	Roseland, (E1)...	300	Taswell, (D8)...	250	Winchester, (G4)...	4,021
Mottpelier, (G3)...	2,297	Oolitic, (D7)...	883	Rossawn, (C2)...	150	Taylorville, (F6)...	150	Windfall, (E4)...	801
Moorefield, (G7)...	85	Or, (D2).....	150	Rossion, (E4)...	150	Teegarden, (E2)...	150	Wingate, (C4)...	464
Mooreland, (G5)...	404	Orange, (G5)...	200	Rossville, (D4)...	595	Tell City, (D9)...	4,086	Winona Lake, (F2)	300
Moore Hill, (G6)...	285	Orestes, (F4)...	395	Royal Center, (D3)	900	Templeton, (C3)...	150	Winslow, (C8)...	1,140
Mooreville, (E5)...	1,781	Oriole, (D8).....	150	Rushville, (G5)...	5,498	Tennyson, (C8)...	386	Wincott, (C3)...	868
Moran, (D4).....	150	Orland, (G1)...	322	Russellville, (D5)...	463	Terhune, (E4)...	200	Wolcottville, (G1)...	666
Morgantown, (E6)	831	Orleans, (E7)...	1,408	Russville, (E4)...	600	Terre Haute, (C6)...	66,083	Wolf Lake, (F2)...	250
Morocco, (C3)...	1,064	Osceola, (E1)...	500	Saint Anthony, (D8)	500	Thayer, (C2)...	150	Woodburn, (H2)...	600
Morris, (G6)...	200	Osgood, (G6)...	1,093	Saint Bernice, (B5)	150	Thorntown, (D4)...	1,432	Woodruff Place,	
Morrisstown, (F5)...	658	Ossian, (G7)...	724	Saint Henry, (D8)...	150	Tiosa, (E2).....	150	(E5).....	1,158
Mount Auburn, (F6)	142	Otisco, (F7)...	200	Saint Joe, (H2)...	386	Tippecanoe, (E2)...	200	Worthington, (D6)	1,853
Mount Ayr, (C3)...	199	Otterbein, (C4)...	702	Saint John, (C2)...	279	Tipton, (E4).....	4,507	Wyatt, (E1).....	200
Mount Carmel, (H6)	127	Otwell, (C8)...	300	Saint Leon, (G6)...	257	Tobinsport, (D9)...	300	Yeddo, (C4).....	150
Mount Comfort, (F5)	200	Owensburg, (D7)...	350	Saint Louis Crossing,		Tocsin, (G3).....	300	Yeoman, (D3)...	200
Mount Etna, (F3)...	137	Owensville, (B8)...	1,239	(F6).....	150	Topeka, (F1)...	512	Yoder, (G3).....	200
Mount Summit, (G4)	274	Oxford, (C3)...	950	Saint Meinrad, (D8)	439	Trafalgar, (E6)...	350	Yorktown, (G4)...	797
Mount Vernon,		Palmyra, (E8)...	227	Saint Paul, (F6)...	650	Troy, (D9).....	454	Young America,	
(B9).....	5,284	Paoli, (E7).....	1,520	Saint Peters, (G6)...	150	Tunnelton, (E7)...	150	(E3).....	300
Mulberry, (D4)...	650	Paragon, (D6)...	444	Salamanca, (H4)...	194	Twelve Mile, (E3)...	350	Zanesville, (G3)...	300
Muncie, (G4)...	36,524	Paris Crossing, (F7)	250	Salem, (E7)...	2,836	Tyner, (E2).....	200	Zionsville, (E5)...	957
Munster, (B1)...	605	Parker, (G4)...	697	Salem Center, (G1)	150	Ubee, (G3).....	150		
Nabb, (F7).....	200	Pataoka, (B8)...	673	Saltillio, (E7)...	127	Underwood, (F7)...	200		

tion lived in cities of over 2,500 people. There were within the state about ninety cities with a population exceeding 2,500, of which nearly twenty had over 20,000 inhabitants each. Most important, at the 1920 census, were Indianapolis, the capital; Fort Wayne, Evansville, South Bend, Terre Haute, Gary, Muncie, Hammond, East Chicago, Kokomo, Anderson, Richmond, Elkhart, Marion, New Albany, Lafayette, and Logansport. Gary in particular has attracted considerable attention during recent years. In 1900 its site on Lake Michigan was but a wilderness of sand; ten years later, there had arisen a prosperous "steel city." It has now every modern improvement and a school system to which the whole country has looked for inspiration. See GARY.

Religion. Of all the churches, the Methodist Episcopal is the strongest in Indiana; indeed, in no other Northern state has this denomination so large a membership in proportion to the total number of church members. The Roman Catholics, on the other hand, have a smaller proportionate membership than in any other Northern state, although ranking second in numbers. The Disciples of Christ, or Christian Church, has increased in numbers very rapidly, and now takes third rank.

Education. No state has shown a greater and more intelligent interest in education, and of the people above the age of ten, there are but 2.2 out of every hundred who are unable to read and write. The school system is excellent, and its administration has been of late years particularly effective. There are compulsory education laws, demanding of all children between the ages of seven and sixteen attendance at school for at least six months out of each year. High schools form a part of the regular school system, and there are in the state about 800 of these. The standard is constantly being raised. The number of pupils attending rural schools has been increased by the introduction of the consolidated district system. Indiana has been very progressive in such matters as vocational and industrial training, and the state agricultural school in connection with Purdue University at Lafayette has promoted very effective work among the rural population. Of especial interest have been the clubs which, by competition, have stimulated the boys and girls to the raising of various crops by the most systematic modern methods.

The teachers' institutes of Indiana have been noteworthy in their results. Each township gives at least one Saturday a month to such a gathering, and the teachers thus get new inspiration and solutions of many of their most difficult problems. A retirement fund is provided for teachers at sixty who have served forty years. A teacher-tenure law is likewise in effect in the state.

The state maintains normal schools at Terre Haute and at Muncie. The higher institutions of learning include the following:

Butler College, at Indianapolis, was founded by the Disciples of Christ in 1849, but is non-sectarian; it has courses in liberal arts, education, and art.

De Pauw University, coeducational, has been maintained by the Methodist Episcopal Church at Greencastle since 1837; at present, its courses cover liberal arts and music, all other professional schools having been abandoned.

Earlham College, at Richmond, is a coeducational institution granting degrees in liberal arts and sciences. It was founded in 1859 by Orthodox Friends, and is located on a beautiful campus adjoining the city.

Purdue University, maintained by the state at Lafayette since 1869, is one of the foremost institutions of its kind in the country. It is organized into schools of engineering, architecture, agriculture, science, and pharmacy, and maintains a valuable extension service. The campus and experiment farm cover 700 acres. Women are admitted, a great many being enrolled in the home-economics courses.

University of Notre Dame, one of the most important Roman Catholic schools in the United States, is located at Notre Dame, near South Bend. It comprises colleges of liberal arts and science, engineering, architecture, and law, in addition to preparatory schools and military training. It was founded in 1842 by the Congregation of the Holy Cross.

Vincennes University, non-sectarian, is the oldest institution for higher learning in the state, having been founded in 1806.

Wabash College, founded in 1832 at Crawfordsville, is a non-sectarian college for young men, giving instruction in liberal arts.

Indiana University, at Bloomington, is one of the two universities supported by the state. The other is Purdue University. Indiana University, founded as a state seminary in 1820, became the state college in 1828, and the state university in 1838. Numerous land grants and state appropriations have been made for its support.

Indiana University includes the college of liberal arts and sciences, graduate schools, schools of law, medicine, dentistry, education, commerce and finance, music, and an extension division. The institution is coeducational, and tuition is free to residents of the state. The Dental College, located in Indianapolis, was originally (before 1925) a separate institution. In the school of medicine, also, the last three years of work are done in Indianapolis. Connected with the medical school are Robert W. Long Hospital and James Whitcomb Riley Hospital for children.

Charitable and Penal Institutions. These are all under the direct supervision of a Board of State Charities, which is composed of non-salaried members appointed by the governor. It is absolutely forbidden that politics or religion be taken into consideration in the choosing of superintendents or other officials for the institutions, merit alone regulating the choice. There are five hospitals for the insane, at Logansport, Indianapolis, Richmond, Madison, and Evansville; a school for feeble-minded children at Fort Wayne; a farm colony for feeble-minded at Butlerville; a soldiers' and

sailors' orphans' home at Knightstown; a village for epileptics at Newcastle; a school for the deaf and a school for the blind at Indianapolis; a state sanatorium at Rockville; two Indiana University hospitals at Indianapolis; and a soldiers' home at Lafayette; while the penal institutions include the state prison at Michigan City, with the associated hospital for insane criminals; a reformatory at Pendleton; the boys' reform school at Plainfield; the girls' reform school at Clermont; the state

farm at Putnamville for male misdemeanants; and the women's prison at Indianapolis. This last-named institution was the first women's prison established in the United States. In it, as well as in the state prison and the reform schools, the principles of parole and indeterminate sentence are in force. Indiana has shown itself ready to adopt the most improved modern methods, and no state in the Union possesses a more carefully administered system of charitable and correctional institutions.

Geography and Resources

Surface Features. Indiana, like Illinois, lies in the great Mississippi Valley and in the basin of the Great Lakes, and in general its surface features are much like those of Illinois. Ages and ages ago, in the great Glacial Epoch (which see), almost all of the state was covered with the vast ice sheet, and many of the rugged hills are but old *moraines*—drift heaps dropped by the glaciers. The state has, in general, a slight slope to the south and west, the highest elevation, 1,285 feet, being found near the eastern boundary line.

Indiana is not, like Illinois, primarily a prairie state, for it had not long ago a heavy growth of timber. The great level plain which extends throughout the central portion of the state meets the prairies in the westernmost counties. While the traveler through Indiana finds mile after mile of neat but monotonous farming country, he also comes upon regions that are decidedly picturesque. Along Lake Michigan are the "dunes"—rounded hills of glistening, wind-swept sand which form a striking background for the dark green of the scrub oaks which here and there grow out of them. In 1923 the legislature passed an act creating a state park of 1,000 acres in the territory of the dunes, fronting Lake Michigan. In the autumn, large stretches of this northern district show a wonderful glow of color, when the crimson and yellow and brown have replaced the green of the leaves of maples, elms, beeches, and oaks. Flowers of unusual variety grow here, making the place a botanist's paradise.

From the dunes eastward across the state, and particularly in the northeast, is the "hills and lakes" region of Indiana, favored by resorters. South of the flat, unbroken plain that occupies the central portion of the state, lies an uneven region of hills and dales typified by Brown County, a place of scenic interest to artists. This culminates in the Knobstone Escarpment, running southward to the Ohio River in a series of steep hills or "knobs" so rugged and deeply carved that the dwellers in this neighborhood claim for them the sounding title of the "Hoosier Alps."

Just west and south of Brown County is a

level limestone plain, in the south of which there are some curious formations. Underground streams have washed out great hollows in the soft limestone, and sinks or caverns have been the result, some of them of rare beauty. Wyandotte Cave, in Crawford County, is in extent second only to Mammoth Cave of Kentucky among the caverns of the country, nor does the latter much surpass it in interest and beauty. This southern part of the state has some valuable mineral springs, also, and French Lick and West Baden in Orange County are famous throughout the Middle West.

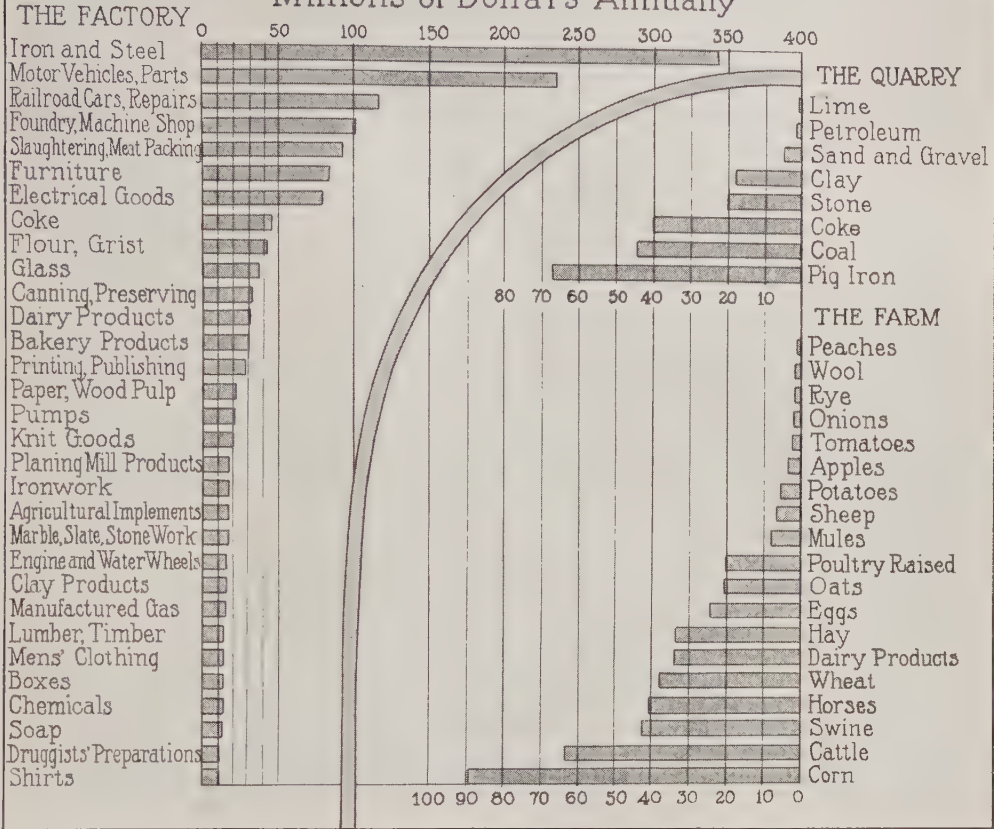
Rivers. By all means the most important river of Indiana is the Wabash, which crosses the state from northeast to southwest, and with its tributaries drains about two-thirds of the area. Its chief affluent is the White River, which, with its two forks, east and west, drains most of the southern half of the state, carrying a volume of water not much less than that of the Wabash itself. The northern tributaries of the Wabash are the Tippecanoe, Eel, Mississinewa, and Salamanie rivers, and Sugar and Wild Cat creeks. The Kankakee, a slow, somewhat sluggish stream, flows for much of its course through marshy land which has been drained and reclaimed. It carries a part of the drainage of the northwestern part of the state across Illinois to the Mississippi.

In the northeast, the Maumee drains a small area into Lake Erie; the Saint Joseph River bends its course from Michigan into Northern Indiana in a sweeping curve, taking the waters of the Pigeon and Elkhart rivers, and then flows back again into its native state, where it empties into Lake Michigan. In the south, Blue River and a few short and unimportant streams flow into the Ohio. Indiana's rivers were important in the early history of the state, for they served as highways for the French voyageurs and traders.

Climate. In general, the climate of Indiana is fairly equable, but July and August have many hot days. The sweeping winds from the north often bring bitter cold during the winter months. The average annual temperature for the state is 52°, and, because of the extent of

INDIANA PRODUCTS CHART

Millions of Dollars Annually



The figures represent averages for three years.

latitude covered, the difference between the extreme north and the extreme south is noticeable, the average for the former being 48° , for the latter 56° . The highest official temperatures ever recorded in Indiana were 103° in the northeastern corner, and 111° in the southern part. The lowest were -33° in the northern part, and -28° in the southern. The south has about two months more growing season than has the north—that is, the period between the last frost in the spring and the first in the fall is that much longer. Everywhere in the state the rainfall is sufficient for agriculture, the amount varying from thirty-five inches in the north to forty-six in the Ohio Valley. Heavy snowstorms are common in the north in winter, but the southern portion has comparatively little snow.

Agriculture. Indiana was once a great hardwood forest, but the early pioneers began the work of clearing the land to make way for agriculture, and to-day there remain but scattered patches of the old forest, supplemented

by second growth. The farms which have taken the place of the forests now cover over eighty-six per cent of the entire land area of the state. With its favorable climate and its fertile soil, Indiana is excellently adapted to agriculture. The crops are varied, but corn stands always at the head of the list in value; in corn production Indiana is surpassed only by Iowa, Illinois, and sometimes Nebraska and Missouri, its crop being about six per cent of that of the entire United States. Wheat is the second crop in importance; hay and oats rank next, while in the river region of the south, tobacco is a valuable crop.

In the northwestern part of the state, in the lake basin, is a region which is practically a great marsh, under flood every spring; but here a special system of under-draining, with millions of yards of drain tiles, has been introduced, and vast truck farms have been developed. This is an especially favorable location for such crops, for the celery, potatoes, onions, cabbages, and other vegetables raised

here are easily disposed of in near-by Chicago. Large crops of tomatoes are grown and canned in the northern part of the state. Throughout the state, various fruits are plentifully grown, apples, peaches, cherries, pears, and strawberries constituting the main yield.

Though Indiana is not one of the chief stock-raising states, in close relation to the production of corn is the hog-raising industry; the dairy industry also is of importance, butter, cream, and cheese being produced.

Important Minerals. Indiana is not one of the foremost states in the production of minerals, yet it has a very considerable mineral wealth. Ranking first in importance is its coal, which is found chiefly in the southwestern section, covering an area of about 7,000 square miles. This is bituminous coal of excellent quality, and the quantity mined each year usually gives the state sixth or seventh rank as a coal-producer.

One of the most characteristic mineral outputs of the state has been its natural gas, which was discovered in 1886 and used most extravagantly, not to say wastefully. Time proved that the supply was by no means inexhaustible, as was at first believed, and the yield decreased seventy-six per cent between 1910 and 1920. The production of petroleum, too, decreased during that decade, as that of Illinois increased. Materials for portland cement are important products of the state, and valuable brick, tile, and pottery clays are widely distributed.

Indiana has the largest output of building stone in the United States, leading Illinois, which ranks second. The great stone quarries in Lawrence and Monroe counties produce about seventy per cent of the nation's limestone for building. This so-called Bedford limestone is of exceptional quality, and has been used for some of the finest buildings in the country, including the Tribune Tower, in Chicago.

Manufactures. With timber, natural gas, petroleum, and coal at hand, Indiana early developed an industrial career which has followed every fluctuation in the production of its various kinds of fuel. When natural gas was discovered in the east-central part of the state, for instance, manufacturing establishments sprang up quickly, glass-blowing factories being of especial importance; and as the supply of gas has declined, these have lessened, many either closing entirely or moving to other localities. But the manufactures of the state as a whole have shown a steady growth, for the increased production of coal has more than made up for the decrease in other fuels. In

1925 the state ranked eighth among the states in the value of its manufactured products.

Along the shore of Lake Michigan, where iron ore from the Lake Superior district and the native coal supply are easily assembled, has sprung up in recent years the state's leading industry—that of steel manufacture. East Chicago and Gary, both near Chicago, are the centers of this industry; Gary has the largest individual steel plant in the world. Great oil refineries are also located in this section, especially at Whiting, much of the crude product being piped from its source, a thousand miles westward.

In Indiana, as in Illinois, among the important industries are those connected with slaughtering and meat packing. These are centered at Indianapolis and Hammond. Flour and grist rank next in value, as is but natural in a state whose chief crops are cereals, while canning is an important industry in the state.

The state is noted for its foundry products and machinery—automobiles and accessories at Indianapolis, Kokomo, South Bend, and Muncie; agricultural implements at South Bend; the making and repair of railroad cars at Hammond and other railroad centers. Dairy and clay products also rank high among the state's manufactures; Indiana is sixth in ceramic production.

Transportation. With New York and Boston to the east and Chicago and Saint Louis to the west, and with Lake Michigan making transcontinental lines farther to the north impossible, Indiana lies in the path of all of the great east-west trunk lines of railway. There are, besides, important north and south lines, and Indiana thus has unusually good transportation facilities, except in the extreme southern counties, where the surface is so broken and uneven that railway construction has been very difficult. The total main-line mileage of railroads within the state is over 7,000. Indiana has been one of the foremost states in the construction of electric railways, possessing one of the most extensive interurban systems in the country. The greatest central station in the world for interurban traffic is at Indianapolis. Indiana also has nearly 5,000 miles of state highway, and motorbus lines are steadily increasing.

While the Ohio River on the southern border has played an important part in the development of the state, neither the Ohio nor the Wabash is now being used for packet service as extensively as in former days. On the northwest, Lake Michigan furnishes important commercial outlets at Gary and Michigan City.

Government and History

Government. Indiana has had two constitutions since its admission to statehood in 1816, and the one under which it is governed

at present dates from 1851. The constitution when adopted restricted the suffrage to white males, and though the Supreme Court of the



Photo: Walker & Weeks

Indiana War Memorial, in Indianapolis. The main building is shown, but back of it other structures and a monument complete the general plan.

United States declared in 1866 that such a restriction was null and void, it was not removed from the constitution until 1881. In legislation Indiana has shown itself progressive. It has statutes forbidding the employment of children under fourteen years of age, strict laws regulating employers' liability, the direct primary, and a city-manager law.

Departments of Government. The executive department consists of the governor, lieutenant-governor, and attorney-general, chosen for four years, and a secretary of state, auditor, treasurer, and superintendent of education, elected for two years. The governor may not succeed himself.

The *legislature*, or general assembly, comprises two houses—a senate of not more than fifty members, and a house of representatives which may not have more than one hundred members. Senators are elected for four years, representatives for two years. Indiana sends to the Federal Congress, according to the last apportionment, thirteen representatives.

At the head of the *judicial* department is the supreme court, consisting of five judges whose term of office is six years. There are also an appellate court, circuit courts, and a system of county and justice courts. Juvenile courts have also been introduced, with the success which has attended them everywhere.

History

The Pioneers. The woods and streams of Indiana were most inviting to the French fur-traders, and it is probable that some of them entered the state in 1679. In the next year La Salle crossed the portage from the Saint Joseph to the Kankakee River, and from that date various explorers found their way into the territory, tracing the course of its rivers and making friends with the Indians. The Miami and Wabash tribes, which occupied the country, seem to have received the Frenchmen gladly, but no permanent settlement was made until the third decade of the eighteenth century. This may have been due to the fact that the Frenchmen often married Indian women and lived much as the Indians did, by trapping and hunting.

Vincennes had been established about 1727, and in 1734 eight French families settled in its neighborhood. For half a century, Vincennes was the only settlement within the present limits of the state. Its primitive wild life Maurice Thompson described in his *Alice of Old Vincennes*.

In 1763 the territory came nominally under the control of the English, but they did not actually occupy the town of Vincennes until 1777, and then they held it but a few months, surrendering it in the next year to George Rogers Clark and his little band of picked men (see CLARK, GEORGE ROGERS).

Early National Period. The colonists had the territory in their hands, but it was by no means subdued, for the Indians were constantly on the warpath, and the little settlements which were springing up here and there were never safe from their depredations. In 1794 "Mad Anthony" Wayne, by a decisive victory called the Battle of Fallen Timbers, ended the Indian hostilities for the time being, and definite progress became possible. Meanwhile, in



FIRST CAPITOL BUILDING

Built at Vincennes in 1816. It is preserved as the oldest historic landmark in the state.

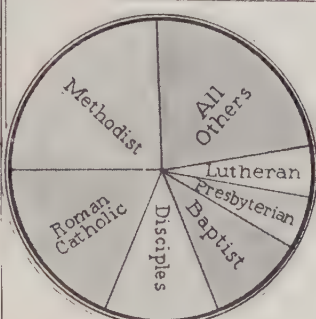
1787, the region had been made a part of the Northwest Territory, but in 1800 the present states of Indiana, Illinois, and Michigan were constituted a separate territory under the name of Indiana. General William Henry Harrison was the first governor, and Vincennes was his seat of government. Michigan in 1805 and Illinois in 1809 were made separate territories, and from the latter date, Indiana in its present area has existed. See NORTHWEST TERRITORY.

Meanwhile the Indians, united under the famous Tecumseh, were again making trouble, but General Harrison put an end to their rising in 1811, at the Battle of Tippecanoe, which earned him his popular nickname, "Tippecanoe." When war broke out in 1812 between the United States and Great Britain, the Indians seized the opportunity to renew their raids, but again they were speedily put down, and after that time, Indiana had no more Indian troubles. Immigrants flocked to the territory, most of them coming from the region to the south of the Ohio, and there was a strong sentiment in favor of slavery. In 1816 Indiana became a state with definite provisions against slavery in its constitution, and the feeling against the negroes was clearly shown by a clause forbidding their immigration into the state. This restriction was removed from the second constitution. The capital, changed from Vincennes to Corydon in 1813, was in 1825 finally established at Indianapolis.

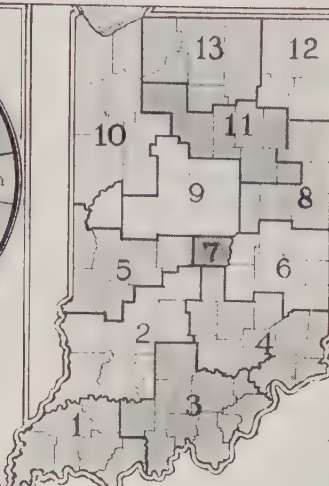
The New State. One of the first things the new state had to face was a period of wild spec-

INDIANA

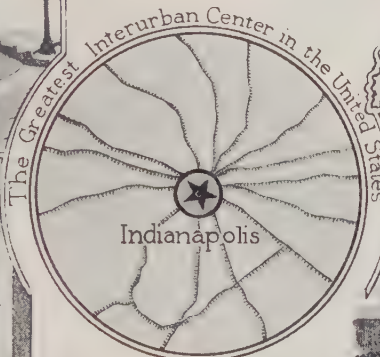
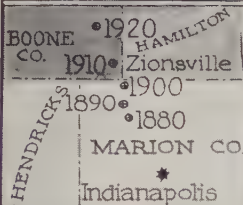
Soldiers' and Sailors' Monument



Religion

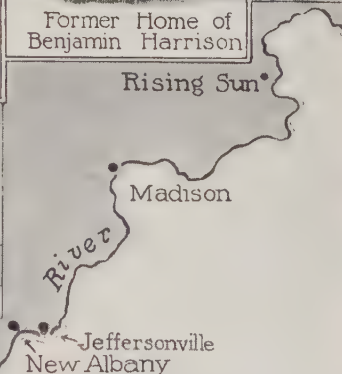
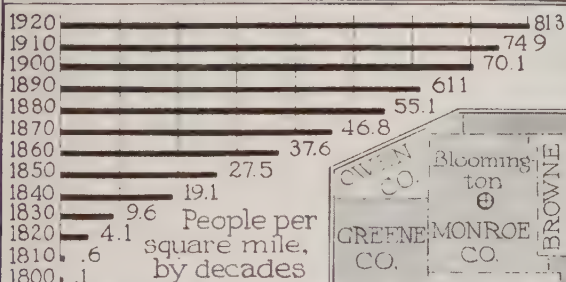


Congressional Districts



Former Home of Benjamin Harrison

Center of Population



Evansville

Ohio

Rising Sun

Madison

Jeffersonville
New Albany

THE RIVER CITIES

QUESTIONS ON INDIANA

(An outline suitable for Indiana will be found with the article "State.")

What five states of the American Union have a combined area smaller than that of Indiana?

What and where are the "Hoosier Alps"? What was the chief difference that the pioneers observed between Indiana land and Illinois land?

What mineral product, at first thought inexhaustible, decreased so that industries suffered temporarily?

Who was the man through whose efforts the Indiana territory first came into the control of the American colonies?

What is the popular name of the state?

What is the outstanding physical feature in the region along Lake Michigan? What effort is being made in connection with that region?

How does Indiana's average production of its chief mineral compare with that of Illinois?

Who was the first white man, so far as known, who entered this territory? Trace his course on the map.

What is prairie land? Why is Illinois designated as a prairie state and Indiana not?

What is the most famous "natural curiosity" of Indiana? Describe its chief features and compare it with a similar formation in Kentucky.

How many states have a greater annual output from industrial establishments?

What is the explanation of the common saying that "Every Hoosier is born with a pen in his hand"?

What states does the drainage of Indiana cross?

Why is Gary the logical place for the great steel industry? For what else is this city noted?

How much larger was the Territory of Indiana as originally constituted than the present state? What was formed of the remainder of the area?

What President received his popular name from an event which took place in Indiana?

When was the state admitted to the Union?

How many states have a greater population? How many have a greater average density per square mile?

Why is it possible to grow successfully in Southern Indiana, crops which cannot be produced in the northern part?

What novel treats of life in Indiana in early pioneer days? What novels give pictures of life in rural districts in later years?

How have the schools identified themselves with the interest of the people in rural districts?

What do we mean by the center of population? In what direction is it destined to move? Why?

What clause in the constitution of Indiana was null and void for almost a score of years before it was removed?

How and where has a marsh been turned into valuable farm land? What are the chief crops grown on it?

Which of Indiana's rivers was made famous by a song?

Name some of the natives of Indiana who have become famous as writers of prose and of poetry.

What President of the United States lived most of his life in Indianapolis?

What well-known citizens of the state have served as Vice-President of the United States?

In what way is Indiana connected with the oil industry?

ulation in land. The possibilities, it seemed, were endless, but the ambitious schemes failed in 1837, and the state was left bankrupt, with a debt of \$14,000,000. These difficulties settled by means of compromise, the state embarked on a period of steady progress. Canals were opened, and the great National Road, completed about 1850, was a highway which put the state into close touch with the older states to the east. Fascinating pictures of the life in the "bottom-land" districts of Indiana, in the middle of the century and later, were given by Edward Eggleston in his three novels, *The Hoosier Schoolmaster*, *The Hoosier Schoolboy*, and *The Circuit Rider*.

A Half Century of Progress. The prosperity and industrial growth of the state in the decades following the war were largely due to the development of the coal deposits and the discovery of natural gas. Indiana in recent years well illustrates the adage that "happy is the people that has no history," for there have been almost no outstanding events in its peaceful progress. An occasional labor difficulty has appeared, and even these worked for good, as they led to the creation of a permanent board of arbitration. There have been stringent anti-trust laws, and various legislative enactments in regard to prohibition. The saloon question was for years uppermost in Indiana's political and social life. From 1906 to 1911, a county-option law was in force; in the latter year the legislature substituted for this a law making the township or ward the unit of option. In 1917 it established state-wide prohibition, to go into effect April 2, 1918. The prohibition-enforcement act is drastic, making the possession of intoxicants a penal offense.

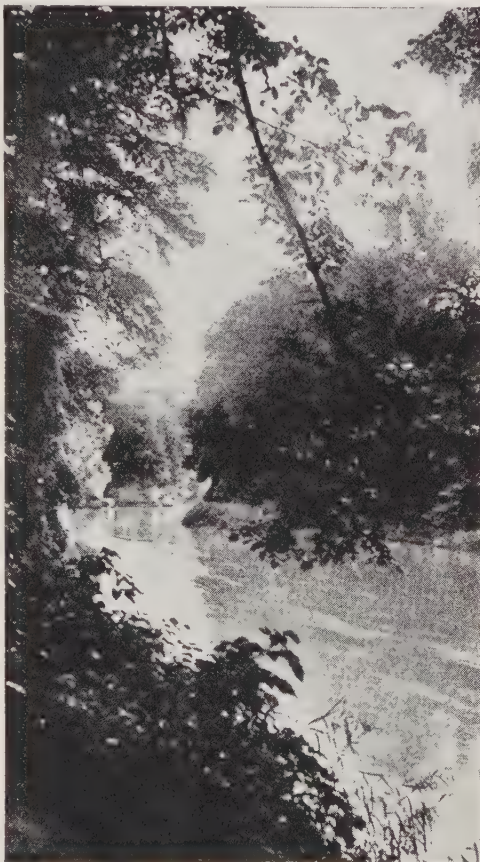
In politics Indiana has for many years been doubtful, and some memorable campaigns have taken place. The state had an especial interest in the Presidential campaign of 1912, as its governor, Thomas Marshall, was the successful candidate for the Vice-Presidency, on the Democratic ticket with Woodrow Wilson, and he was chosen to the same office in the election of 1916. Another Indianian, Charles W. Fairbanks, was also honored with the Vice-Presidency during Roosevelt's second Presidential term; he was the candidate for the same office in 1916, on the Republican ticket with Charles E. Hughes. In somewhat earlier days, Thomas A. Hendricks, one of Indiana's most famous sons, died while holding the office of Vice-President in the first Cleveland administration. Benjamin Harrison, twenty-third President, spent most of his life in Indianapolis. In 1916 the state celebrated the centenary of its admission into the Union. The Republican national ticket carried the state in 1920, 1924, and 1928.

The area close to Lake Michigan has been developed by great steel industries, as has been

stated. The densest population of the state will probably be in this section within a decade or two.

In Indianapolis civic spirit has initiated an Indiana War Memorial, an enterprise planned to occupy a width of one block and a length of four blocks.

H.S.L.



TURKEY RUN STATE PARK

Related Subjects. The following articles in these volumes will add much that is of interest to the story of Indiana:

CITIES AND TOWNS

The cities listed below are described in these volumes under their own titles. Other cities or towns will be found listed on the back of the state map.

Evansville	Indianapolis
Fort Wayne	Muncie
Gary	South Bend
Hammond	Terre Haute

Vincennes

LEADING PRODUCTS

Building Stone	Oats
Cement	Steel
Coal	Tobacco
Corn	Wheat
Meat and Meat Packing	

PHYSICAL FEATURES

Ohio River	White River
Wabash River	Wyandotte Cave

THE STORY OF INDIANAPOLIS



INDIANAPOLIS, IND., the capital and the largest city of the state, and the county seat of Marion County, is noted as being the second largest state capital in the United States. Only Boston, in this group, is larger. Indianapolis occupies both banks of the White River, and is said to be the largest city in the world not on navigable water. It lies in almost the exact geographical center of the state, fifty-six miles northeast of Bloomington, 183 miles southeast of Chicago, and 109 miles northwest of Cincinnati. More than ninety-four per cent of the people are native-born. Population, 1928, 382,100 (Federal estimate).

General Description. Indianapolis lies 700 feet above sea level, in a rolling, well-wooded country, rich in mineral and agricultural resources. The heart of the city is occupied by a circular plaza known as Monument Place (formerly Governor's Circle), and from it radiate, diagonally, four wide avenues to the four corners of the city. In the center of this

plaza is a magnificent soldiers' and sailors' monument designed by Bruno Schmitz of Berlin, one of the most artistic memorials in the world. It is a shaft of bronze and stone 285 feet in height, surmounted by a figure thirty-eight feet high, representing "Victory"; the two fountains playing at its base spout 20,000 gallons of water per minute. Surrounding the monument are bronze statues of General George Rogers Clark, William Henry Harrison, ninth President of the United States, and Governors James Whitcomb and Oliver Perry Morton, all conspicuous in the history of the state.

The World War Memorial Plaza occupies five blocks near the downtown district, and is a project of the city, county, and state. The World War Memorial Building houses the national offices of the American Legion. The park reservations of the city comprise 2,580 acres, including Riverside Park, covering 950 acres on both sides of the river. Forty-six playgrounds are maintained by the city. To the northeast is located the Benjamin Harrison Army Post. The Indianapolis Motor Speedway is the scene of the annual international 500-mile race, five times won by Indianapolis-made motor cars. There are fifty-three miles of boulevard within the city limits.

The most imposing of the city's numerous handsome buildings is the state capitol, built of Indiana limestone. Interesting also are the Murat Temple, in Oriental design, and the public library, a notable example of Greek architecture. The unpretentious home of the Hoosier poet, James Whitcomb Riley, stands in Lockerbie Street, where it is open to the public. A central location and admirable transportation facilities have made Indianapolis a convention center.

Transportation. Indianapolis is a noted railroad center. It has the service of six trunk lines of railroad—the Cleveland, Cincinnati, Chicago & Saint Louis (Big Four); Illinois Central; several divisions of the Pennsylvania Lines; the Baltimore & Ohio; the Nickel Plate; and the Monon Route.

The great interurban system of Indiana radiates from Indianapolis, its center, like a spider's web, to all important cities in the state, and into Illinois, Michigan, and Ohio. Shipping facilities are further increased by the Belt Railway, which surrounds the city. Extensive motorbus service connects the capital with nearly every town in the state.

Industries. The excellent shipping facilities of Indianapolis and its nearness to vast coal mines and to natural gas and oil fields have helped to make the city a leading industrial center. There are over 1,000 manufacturing plants. The city is the home of the Marmon, Duesenberg, and Stutz motor cars. Other industries include the manufacture of automobile accessories and of wearing apparel, particularly silk hosiery; canning of foodstuffs, flour-milling, printing, and the production of metal goods.

Institutions. Almost every branch of learning is represented by the various schools of Indianapolis,

including a training school for teachers, Butler College, the medical, dental, law, and pharmacy schools of Indiana University, Indiana Central University, John Herron Art Institute, and private schools. There are state schools for the deaf and the blind, a public school for crippled children, a state library, and an orphans' school. Other state institutions include the James Whitcomb Riley Hospital for Children, the Indiana Prison for Women, and the Indiana Central Hospital for the Insane. Here also are a National Guard armory, a municipal hospital, and the state fair grounds.

History. Indianapolis was settled in 1820 and was named in 1821. In 1825, when the seat of government was removed from Corydon, it became the state capital; at this time Indianapolis had only 600 inhabitants and one street. It was incorporated for the first time in 1832. With the construction of the first railroad in the state, in 1847, the growth of the town began, and in the same year a city charter was granted. Further impetus was given the city's development by the introduction of natural gas in 1889. This factor in its commercial growth declined, however, and was replaced by a large yield of coal from the vicinity. The city was one of the first in the United States to use electricity for lighting.

In 1913 Indianapolis suffered from the effects of the Ohio Valley floods; three years later, the city had completed a concrete levee forty feet high, constructed along the west bank of the White River. In 1917 a handsome, modern Union Depot was erected, and the tracks entering it were elevated. The city adopted a zoning ordinance in 1922.

E.U.G.

INDIANA UNIVERSITY. See **INDIANA** (Education).

INDIAN BEAN. See **CATALPA**.

INDIAN CORN. See **CORN**.

INDIAN DETOURS. See **NEW MEXICO** (Transportation).

INDIAN DIPPER. See **PITCHER PLANTS**.

INDIAN FIG. See **CACTUS**.

INDIAN HEMP. See **DOGBANE**; **HASHISH**.

INDIAN MALLOW, *mal' o*, OR **VELVET LEAF**, OR **STAMP WEED**, is an Asiatic weed of the mallow family, possessing velvety, heart-

shaped leaves. At one time these were used in stamping butter. The Indian part of the name refers to the original home of the plant. This widely distributed weed is troublesome to farmers generally, but is an especial pest in cornfields. It grows from a few inches to six or more feet tall, according to the fertility of the soil, and has attractive orange-yellow flowers. It was, in fact, originally cultivated in the United States as an ornamental. In China and Japan, under the name *chingma*, the plant is valued as the source of a fiber suitable for making twines, rope, and coarse sacking.

B.M.D.

Scientific Name. The scientific name of Indian mallow is *Abutilon theophrasti*. See **ABUTILON**.

INDIAN MYTHOLOGY. See **INDIA** (Mythology).

INDIAN OCEAN, *o' shun*, one of the great oceanic divisions of the world, reaching from Africa eastward to the East Indies and Australia, and from Asia southward to the Antarctic Ocean. The peninsula of India divides it into two great basins in the north—the Arabian Sea and the Bay of Bengal. The Indian Ocean is fed by several large rivers, the chief being the Indus, Brahmaputra, Irrawadi, Salwin, Ganges, Chat-el-Arab, Tigris-Euphrates, and the Zambezi. The principal islands in its waters are Madagascar, Mauritius, Ceylon, Reunion, Rodriguez, Socotra, and the archipelagoes of the Andamans, Nicobars, Mergui, Maldives, and Laccadives. While the winds on this ocean are usually gentle, hurricanes sometimes sweep over it. The north-eastern part is the deepest, where soundings of 20,340 feet have been made. The ocean is about 10,970 feet in average depth. For comparative sizes and fuller description of the seas of the world, see **OCEAN**.

R.H.W.

INDIAN PAINT. See **BLOODROOT**.

INDIAN PINK. See **CARDINAL FLOWER**.

INDIAN RESERVATION. See **INDIANS**, **AMERICAN** (The Indian and Civilization: Indian Reservations).

INDIAN ROOT. See **SPIKENARD**.



INDIANS, AMERICAN, the "redskins" of romance and history. They were the most picturesque of the primitive races of mankind, though under the influence of civilization they have lost most of this charm. Before the coming of the "paleface," the Indians of the United

States had made little progress in a material way, and were truly "children of nature," savage in warfare and often relentlessly cruel. Nevertheless, they excelled the European of their day in many of the simple virtues—honesty, reverence for their deities, faithfulness to

their standards of virtue, self-denial, affection for their kin, and ability to suffer uncomplainingly. Their intelligence, while not directed to the same ends as that of civilized man, was keen. And even the treachery and blood-thirstiness ascribed to Indians were less than those of their Spanish conquerors in Peru and Mexico, and were sometimes equaled by those of the French, English, and Dutch colonists of North America.

One who reads Longfellow's *Hiawatha* and Cooper's *Leather Stocking Tales* is sure to feel sympathy and admiration for their Indian heroes. Though Cooper was accused of portraying the natives with good qualities which they did not possess, his work is defended by those who know the red men best. The history of William Penn and his followers, and of the Hudson's Bay Company, which traded over all Canada for more than two centuries with never a serious break with any tribe, proves that the Indians were not treacherous in their dealings with those who treated them fairly.

Physical Characteristics. The poetess Lydia Huntley Sigourney, who speaks of the Indian advancing to greet the Pilgrims—

With towering form and haughty stride,
And eye like kindling flame,—

is picturing the traditional native of Eastern North America. The Indian, wherever found, has as distinguishing features the straight black hair, the broad face which gives the effect of high cheekbones, the striking aquiline nose, the slightly Chinese slant of the eye, and the scant beard. Strangely enough, considering the universal employment of the name *red man*, the Indian is less red than his white neighbor; his complexion is in truth brown, sometimes a very dark shade.

Indians have less hair on their bodies than the average white person. The males grow a moderate amount of hair on the chin and lip, but keep themselves beardless by plucking the hairs. Side whiskers are usually absent.

Origin. No one knows where the Indian came from, or how long he has inhabited this continent. By many scientists, he is believed to be descended from tribes of Central and North-eastern Asia, for the two groups resemble each other in certain physical characteristics. Stories once widely believed, that the Indians are descendants of the lost Hebrew tribes or of shipwrecked Europeans, have been proved impossible, for the Indian languages are absolutely different from other tongues and must have been spoken for thousands of years. The generally accepted theory is that those natives of America who preceded the white man crossed from Asia at Bering Strait, or farther south, by a passage which has now disappeared.

Numbers. Anglo-Saxon North America contains but a small fraction of the Indian race.

In the United States, Canada, and Alaska there are about 460,000, the survivors of a population estimated to have been a million before the arrival of the white man. Mexico has nearly six million Indians of pure blood, and more than that number of inhabitants partly Indian. South America's Indian population has never been counted, but is greater than North America's, and, like Mexico's, is largely mixed with European blood. In Canada the number of Indians is growing smaller, but in the United States, while rapidly decreasing for a hundred years, has been increasing since the beginning of the present century, if we include all degrees of admixture. In 1910 the full-bloods were counted for the first time and found to number 150,053. In 1925 there were about 350,000, of both pure and mixed blood.

South American Types. The Indians whom the Spaniards found in South America represented all degrees of advancement from near-civilization to the crudest barbarism. Those first seen by Columbus, in the West India Islands, were a wild stock from the Amazon regions, dwelling in huts of tropical grasses or palm leaves, wearing little or no clothing, possessing only stone, wooden, and shell implements, and depending largely on fishing for their food. Columbus called them Indians, because he thought he had reached the real India. Farther south on the continent, some of the natives were even less advanced, and those of Tierra del Fuego are to-day in the lowest grade of civilized society. In Peru, however, the Spaniards under Pizarro found the Incas, a people with a highly organized government, who constructed massive stone buildings and were skilled workers in gold, silver, and copper, weavers of beautiful cloth, and farmers who understood irrigation and fertilizing. Their story is interestingly told in Prescott's *Conquest of Peru*. The descendants of the sixteenth-century Indians form a very considerable part of the population of South America. Some have intermarried with the white races, while unnumbered thousands remain close to the line of barbarism. In the West Indies, the native race has long been practically extinct.

In Mexico and Central America. As in South America, the early Indians from Panama to the Rio Grande were of many stages of culture. The Mayas of Yucatan and other southern states of Mexico, as well as of Guatemala and British Honduras, had reached a civilization higher than that of the Incas, but even before the arrival of the conquering Spaniards, their political power had decayed and their noble cities were in ruins. They possessed a practical method of writing on paper, and bound their documents in a form resembling our own books. They had an accurate calendar which extends back for a period of twenty centuries, and some knowledge of astronomy.



From the Painting by Walter Ufer

THE SNOW TRAIL

They wove clothing of cotton. The Aztecs, another Mexican people, though not so advanced as the Mayas, attracted more attention from the Spaniards because of their military power. Prescott's *Conquest of Mexico* tells us what the early Spaniards learned of them, but one who reads the book should know that such titles as *king*, *queen*, *noble*, and *prince* were wrongly applied to the influential natives by the European conquerors, who failed to understand the Indian system of government and chieftainship. The writing of the Maya, Aztec, and other Mexican races is as yet, except in a few instances, not fully understood. Unfortunately, the early Spanish missionaries, who might have learned the secret from the natives, burned most of the native records which came into their hands.

The Early Indians in the United States and Canada

Though not greatly differing from each other in degree of civilization, the Indians north of Mexico varied widely in customs, housing, dress, and religion. Each of the hundreds of tribes was somewhat influenced by its neighbors, and there were no such sharp differences as existed between Frenchmen and Spaniards, or English and Scots. But in a rough way, several types can be distinguished. The *Woods Indians* occupied the area from the Atlantic to the Western plains and prairies; they were the growers of corn and tobacco, the hunters and fishers, the wonderful woodsmen whom the English and French first met. The *Plains Indians*, from the Mississippi to the Rocky Mountains, were largely wandering and warlike, hunting the buffalo and other game for food. After the arrival of the white men, they became great horsemen. The *Southwestern Indians*, of New Mexico and Arizona, included Pueblos, or dwellers in villages of sun-dried *adobe* (ah-do'-bay) brick; cliff dwellers; and nomads, or wanderers. In some

ways they were the most nearly civilized of the natives whose homes were north of Mexico.

The California tribes, separated from the influence of the others by the mountains, were on the whole crude. They were ignorant of agriculture, lived on acorns, seeds, and fish, and wore very little clothing. Their neighbors, the Northwest Coast Indians of Washington, British Columbia, and Southern Alaska, were also unacquainted with farming, but they built

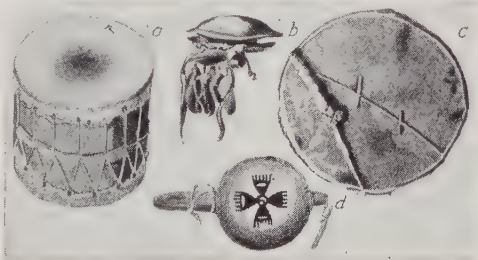
large wooden houses, carved totem poles, and paddled about in enormous cedar canoes. The *Plateau Indians*, who dwelt between their kin of the plains and the Pacific coast, but were shut off from them by mountains, were simple people, eating largely of fish, and dwelling in partly underground houses or brush huts.

Language. Nearly two hundred languages and fifteen hundred dialects are known to have been spoken by the Indians. Other languages no doubt perished when the tribes speaking them were annihilated in battle or became extinct through natural causes, for, excepting a Cherokee alphabet invented in 1821, none but the Mayas and the Aztecs had any system of writing. Indians speaking the same language did not always live in adjoining regions. Thus, Siouan tribes, besides occupying the great plains and part of Wisconsin, were found at Biloxi, Miss., and in Virginia and the Carolinas, dwelling in the midst of Iroquoian, Algonquian, and Muskogean tribes. For communication between neighbors of different speech, there was a highly developed sign language. Some sounds unknown in languages of white men are common in Indian tongues, but others, such as our indispensable *f* and *r*, are often lacking. The grammar of the various Indian tongues is very complicated.

The Spanish spoken in South America contains many Indian words, and our English, besides thousands of names for places, has a number of common native terms, such as *tobacco*, *chocolate*, *squash*, *succotash*, *moose*, *caribou*, *hickory*, *hurricane*, *hammock*, *tomato*, *coyote*, *toboggan*, *caucus*, *mugwump*, *moccasin*, *cayuse*, etc.

Indian Thought. So different was the Indian way of thinking from that of the European that the pioneers failed to understand their brown-skinned neighbors, and much of what has been told about the original American is erroneous. The name *happy hunting ground*, for the supposed home of the spirits of the de-

parted, is purely a myth of the white man, for the Indian looked upon the chase as difficult labor, and thought of heaven as a place where there was nothing to do but dance and sing, play games, eat, or gamble. The Great Spirit, too, is an invention of our own, for the Indians seem to have had no conception of God as a single all-powerful being, all objects, both animate and inanimate, being endowed with certain spiritual powers. Nevertheless, they



DRUMS AND RATTLES

- (a) Box drum. (b) Pueblo turtle shell, with hoofs of goats or sheep; fastened to the knee when dancing. (c) Tambourine drum of the Menominee Indians. (d) Pueblo painted gourd with wooden handle.

[Illustrations from specimens preserved in the United States Bureau of Ethnology.]

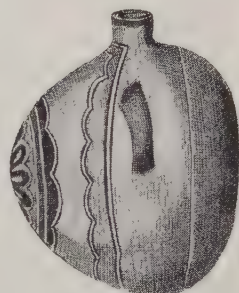
INDIAN ARTS and CRAFTS



Hopi clay doll

Mound pottery
Arkansas

Northwest coast carving

Stone vessel
AlabamaChiricahua cat-shaped whistle
(Terra Cotta)Moki canteen
(Earthen)

were intensely religious, after their own fashion. Almost every act of their lives was performed as religion prescribed.

For the Indians there was a soul not only in man and the animals, but in every tree and flower, and even in an inanimate object like a canoe. Certain of the birds and animals were counted more powerful and intelligent than men, and, like the deities of the ancient Greeks, capable of influence for good or evil. Most of the tribes were divided into clans of close blood relations, whose *totem* was a particular animal from which they were often believed to have descended. The sun and the four principal directions, north, east, south, and west, were often objects of worship. The *shaman*, a sort of priest, was often the *medicine-man* of a tribe. Sickness was usually supposed to be the result of displeasing some spirit or of witchcraft, and was treated with incantations and prayers.

The Indians have many beautiful and weird legends. That of Hiawatha has a permanent place in literature, though, unfortunately, the hero is portrayed as an Algonquin of the Lake Superior region, when he was really a chief of the Iroquois of New York state. Many of the Indian traditions resemble the old Bible stories, particularly those of Joseph, of the passing through the divided waters of the Red Sea, and of the guidance and feeding of the Israelites in the wilderness. Other tales are of

the animals building the world, or bringing fire to men, or of tragic romances, or mighty achievements of fabled ancestors.

With the Indian, the basis of virtue was self-control. To conceal the emotions and to endure torture unflinchingly was required of each. Gambling was believed an excellent pastime, because it gave the loser an opportunity to display his fortitude, especially if he lost everything he possessed. Among the Iroquois, theft and other crimes are said to have been so infrequent that there were no rules for punishment, and an Indian always kept a promise, no matter what the consequences to himself. It will thus be readily seen why most white people inspired in the Indian the thought of distrust.

Government. Perhaps because each man governed himself with respect for the rights of his neighbors, elaborate organization of the Indian community was unknown. The chiefs as a rule had little power of their own, but carried out the will of the tribe. The chieftain's office was not hereditary in the European fashion, though a man's successor was usually of his own family. His election was sometimes by the women of the tribe. Each tribe was a unit in itself, with its own lands roughly bounded by treaty with its neighbors. Besides the confederations of Incas and Aztecs, which the Spaniards looked upon as empires, there

INDIAN BASKETRY



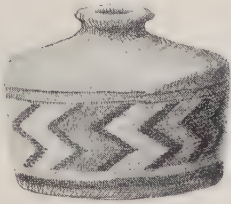
Moki food basket



Klamath basket



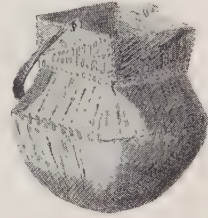
Moki food tray



Thinkit turned basket



Apache Basket



Iroquois birch bark vessel

existed a remarkably organized union among the Iroquois, called the Five Nations, and later the Six Nations.

War was constant among the Indians before the arrival of white men. But as the coast areas were occupied by the newcomers from over the ocean, the natives were crowded toward the interior. Each tribe encroached upon the lands of its western neighbors, who, if defeated, were in turn driven farther inland. To this almost continuous strife the intrigues of the Europeans added. The French, to gain the favor of the Algonquins, aided them against the Iroquois, with the first guns known to the natives. The English then took the side of the Iroquois; in the War of 1812, this tribe was allied with the British against the Americans. In later days, individual white outlaws stirred them to frequent fighting.

Ceremonies featured by the smoking of the calumet, a stone pipe, marked the beginning and end of war, which could only be declared by a council of all the men and women in the tribe. The warriors daubed their bodies with bright paint and donned war-bonnets of eagle feathers. The type of bonnet worn by the old brave, shown on page 3428, frequently had a queue of feathers extending nearly to the ground. All customs varied from tribe to tribe, so that what is said of one tribe or group of tribes is not necessarily true of another.

In an Indian community, no individual owned land, but the right of each to the plot which he cultivated was respected. A man's weapons were his own, but generally the tools and often the food, and among the tribes of the plains even the tepee, belonged to the women. Personal belongings were often buried with their owner, that their souls might accompany his to the future home. Remaining property was distributed in the tribe or bestowed upon heirs. A man's children generally belonged to their mother's clan, and they inherited from her brothers instead of from their father. Wealth was sometimes an honor, but generosity was still more esteemed. The most common form of money was *wampum*.

Agriculture and Industry. It is a mistake to regard the Indians merely as fishers, hunters, and fighters. North America has never been as thoroughly a country of farmers as it was before its discovery by Europeans. It is said that corn must have been developed from grass by many centuries of cultivation, and tobacco, beans, squashes, pumpkins, sweet potatoes, peanuts, gourds, sunflowers, and cotton were raised by many of the tribes. Irrigation was extensively practiced in the Southwest, and some of the tribes fertilized their fields with bits of fish. Agricultural implements were of the rudest character of wood, with perhaps a stone, shell, or bone digging point.

In basket work and pottery most of the tribes were skilful, and many practiced weaving. Of metals, those north of Mexico knew little, though native copper was crudely mined and melted and hammered in the Lake Superior regions, and after the appearance of the Spaniards some of the Indians along the Mexican border became skilful silversmiths. Decorations were nearly always symbolical, because of the belief that something of the power of the animal or other deity represented was present in the symbol. As a rule, women did the manual labor, both in the field and in the home, but men made stone arrowheads, bows, and other implements of war or the chase, and executed decorations which were connected with religion.

[See the pictures accompanying the articles BOW AND ARROW; FIRE; also, see POTTERY.]

Indian transportation was of the crudest type. There was not a wheel of any character on the continent before the coming of the white race. Horses were unknown till introduced from Europe, and even then the Indian vehicle was the drag shown (illustration, page 3425). Eskimos and their neighbors employed dog sledges and traveled on snowshoes. On the water, canoes of birchbark or hollowed logs were the principal conveyance, but in California a crude boat was made by fastening rushes together, and on the Missouri River tub-shaped frames were covered with skins.

Architecture. The tepee, or tipi, the conical tent which we ordinarily think of as the Indian's home, was not in general use except on the plains. Villages in the Southwest were constructed of stone or of adobe, a sun-dried brick made in round balls before the knowledge of flat bricks was gained from the Spaniards. The natives of the North Pacific coast built houses of rough boards, and those of the Atlantic, oblong structures covered with bark. Several families lived in each of these; there was generally a large council hall, and sometimes even a men's club house. Many villages were protected by stockades.

[For a description of the Indian mounds, see the article MOUND BUILDERS.]

Dress. Shirts and leggings of deerskin were in most tribes the main clothing for both men

and women before the arrival of the white man, but the tribes of the Southwest wove cotton garments and made robes of plaited rabbit fur. Blankets or robes were worn everywhere for warmth or for dignity, and some really beautiful patterns were developed. All of these styles were in vogue until very recent years, and some of them yet persist.

Like all primitive races, the Indians were fond of personal adornment. They cut their clothing into fringe at the edge, and frequently embellished it with feathers or elks' teeth. On festive and warlike occasions, they painted both face and body. In some tribes tattooing was practiced. Necklaces of shells, earrings, and sometimes lip and nose jewelry were worn, and men as well as women were proud of long hair.

Amusements. The old idea of the Indian as a man of constant dignity and haughty silence was far from true. Though quite theatrically solemn on occasions of importance, the Indian was fond of games and sports and laughter. His leisure was spent in amusements ranging from guessing to several forms of ball games, on all of which he gambled. The Indian women played dice games and football, while the children, like children the world over, imitated the occupation of their

parents in playing war, or hunting with bows and arrows, or in keeping house with dolls. Dancing was a universal amusement, but was oftener a religious ceremony. It was accompanied by the music of drums and singing in very complicated rhythms, often rendered more difficult by the adoption of a measure of time for the voices different from the drum beat.

The Indian and Civilization

In the United States and Canada, the Indian of late years has been rapidly absorbing the best elements of the white man's civilization, aided by the paternal interest of the national governments. Unfortunately, this has not always been true. As the frontiers of European settlement were pushed westward, the more adventurous and less scrupulous elements of the new population were constantly in contact with the natives. The Indian's worst enemy has been the white man's whisky. A half



HOME

How the Blackfoot lives during the summer, at the present time. Photographed in Glacier National Park.

century ago, the traders on the Plains could add four gallons of water to a gallon of alcohol and trade the mixture to an Indian for forty buffalo robes, each worth five dollars, the winter's work of the women of the tribes. In Canada the scrip (certificates of right to free land) which the government gave to the half-breed Indians was often transferred to white men in return for whisky. Later, in both countries, the sale of whisky or its substitutes to an Indian was subject to heavy penalties.

In the United States there have been hundreds of wars with the Indians, the last ending with the surrender of the Apaches in 1886. Many of these were caused by unjust actions of white men, or by such harsh measures of the government as the forcible removal of a tribe from one home to another. Canada was more successful in its treatment of natives, partly because the early French settlers were more friendly with them than the English, partly because of the Hudson's Bay Company's fairness in dealing with

them, and also, no doubt, because of a more cordial attitude of the government in the early days. The only outbreaks of importance in Canada since colonial times were the Red River Rebellion of 1870 and the Saskatchewan Rebellion of 1885 (both of which see).

Since 1887 the policy of the American government has been to abolish the independence of the Indians and to make them citizens of the states in which they live. This has been brought about gradually through education and through individual division of the tribal lands. In 1924 Congress passed a law conferring full citizenship on all its Indian population that had not previously been admitted to the status of citizens. In Canada the natives are still kept apart, in most instances; some of the

provinces do not permit them to become citizens.

Official relations of the United States with Indians began during the Revolution, when agents were appointed to live among the tribes and secure their friendship. Afterward, as civilization pressed westward, the Indians were called upon to cede lands around trading posts,

then others more distant, and finally, all but those set aside as reservations; and even these have decreased as the red men have assumed the standards of the whites. Until 1849, the War Department was in charge of Indian affairs; since then there has been assigned to them a bureau in the Interior Department, for which Congress makes regular appropriations.

The government's policy has on the whole been generous and just, though its agents have not infrequently been tyrannical and unfriendly to their charges. The main criticisms of official treatment of the Indians are that infertile lands have sometimes been assigned to them, and that they have

been forced to abandon their old homes for new when white men coveted them. The greatest single cause for friction, therefore, was the breaking of treaties.

The British North America Act reserves to the Dominion government the control of Indian affairs throughout Canada. All matters relating to the Indians are in charge of a Department of Indian Affairs, at whose head is a superintendent-general, usually the Minister of the Interior. The interests of the Indians are carefully guarded by law; all property held for them can pass from their possession by sale or lease only by their own consent, and the proceeds of all such transfers are invested for their sole advantage. They are enfranchised whenever they can meet qualifi-



Photo: Visual Education Service

THE SILENCE BROKEN

cations imposed by law. In Manitoba, British Columbia, and the Northwest Territories, they are denied votes, but in the other provinces, if an Indian possesses and occupies a distinct tract of land in an Indian reserve, the improvements on which are worth at least \$150, he is qualified as a voter. Agents live on the Indian reserve, and government inspectors visit each agency from time to time to see that the interests of the Indians are protected.

Indian Education. Since 1819 in the United States, and since Confederation in Canada in 1867, there has been systematic government supervision of Indian education. Earlier instruction of the natives was by missionaries.

About 66,000 Indians attend school in the United States, out of 78,000 that are eligible for attendance. Besides the day schools and the boarding schools situated on the reservations, a few others are established in the non-Indian portions of the country. Through them the pupils come in contact with civilization. The Five Civilized Tribes in Oklahoma maintain their own schools, and these have an attendance of about 20,000.

The policy of the government provides for each Indian, first, a thorough knowledge of elementary subjects such as English, arithmetic, geography, and United States history, and then, for the boys, training in agriculture and useful arts and often in a special trade or profession; for the girls, instruction in home-making.

In Canada the number of Indians at school is usually about 7,000. There are more schools under government supervision than in the United States, partly because the natives are more widely distributed. Most of the schools are controlled by one Church or another, whereas, in the United States, the government now extends no aid to denominational schools.

Present Advancement. It has not been an easy task to lead the Indian rapidly toward individual enterprise, but he has learned that his undivided initiative is indispensable to the highest service he can render to himself and to his race. Indian youths are making advancement that is in many ways gratifying. Boys' and girls' clubs exist on more than forty reservations, and they have several thousand members. White children are no more enthusiastic over their corn, potato, garden, sheep, and poultry clubs, to name only a part of these activities, than are their dusky Indian neighbors. Indians are an increasing factor in the constructive development of the West and Southwest, where they are employed not only as day laborers in the fields, in mines, and on railroads and irrigation projects, but are filling responsible posts in business and professional lines.

Some Indians have become very rich through their ownership of land in oil-producing territory; not a few are millionaires. They receive their just percentage of the proceeds of production, and Indian agents endeavor to guard their interests. The oil and mineral interests of the tribes are estimated to be worth nearly \$1,000,000,000.

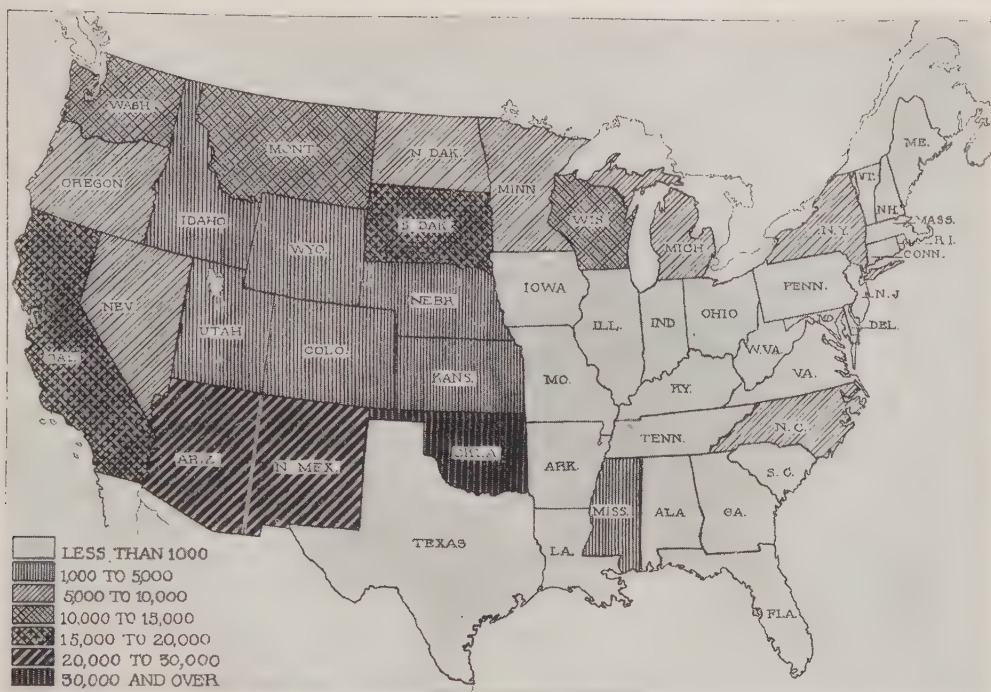
Individual and Tribal Property. That the tribes are in possession of wealth is shown by the following table of property values of some of the leading tribes. It will be well to remember that not many years ago all Indians were helpless wards of the government:

TRIBE	INDIVIDUAL	TRIBAL
Five Civilized Tribes.	\$255,000,000	\$12,000,000
Osage.....	52,000,000	13,000,000
Klamath.....	33,000,000	28,000,000
Navaho.....	24,000,000	22,000,000
Yakima.....	20,000,000	6,000,000
Rosebud.....	20,000,000	435,000
Kiowa.....	20,000,000	659,000
Crow.....	10,000,000	570,000
Flathead.....	10,000,000	4,250,000

The total individual and tribal property of the Indians of the United States is over \$1,650,000,000, of which one-third is owned individually. This personal property consists of such possessions as lands, funds in bank and in the hands of superintendents, homes, furniture, barns, wagons, horses, automobiles, implements, stock, poultry, etc.

Indian Reservations are territories set apart as homes of the Indian charges of the nation. They are maintained in both the United States and Canada. In the latter country, they are called Indian reserves. White people are prohibited from settling upon them, and no Indian is permitted to pass the boundaries of his reserve except on proper business or by consent of the agent in charge. The government exercises paternal care over the residents, protects them in their legal rights, conducts schools, and teaches the arts of civilization. As rapidly as possible, the Indians are induced to abandon tribal relations and adopt the habits of the white race.

The amount of land in use for Indian reservations is constantly changing. In some cases, additions are made; in others there are withdrawals for purposes of conservation (which see). Further, under the policy of absorption of Indians into the nation, the territories of the more civilized tribes are being divided and opened for white settlement. When it is decided to close a reservation in this fashion, each member of the tribe is allotted a reasonable amount of ground, and the remainder of the holdings is sold and the proceeds paid to the Indians. The members of the Five Civilized Tribes of Oklahoma have in this way become fairly wealthy.



DISTRIBUTION OF INDIAN POPULATION OF THE UNITED STATES

Reserves in Canada are several times the number of reservations in the United States, many of them containing only a few acres.

This is because the Dominion government has never followed the policy of concentrating its Indians.

Indian Families and Tribes

A classification of the Indians of the United States and Canada reveals that there are now 264 tribes and small remnants of tribes worthy of note in the two countries. In the paragraphs below, those which are most important are described:

Linguistic Families or Confederacies

Algonquian, *al gon' kih an*, the largest family of tribes in the United States and Canada, both in colonial days and at the present time. They first inhabited the land from Labrador southwest to the Carolinas and Tennessee, and west to the Mississippi River, surrounding the Iroquois and bordering on the Siouan tribes to the west and south, and the Athapascan tribes to the northwest. Though originally of a rather peaceable disposition, their New England representatives resented the depredations of the colonists, and wherever they met the English, long and bloody wars followed, until the natives were either extinguished or driven across the Alleghenies. Throughout the French and Indian Wars, they fought stubbornly against the English, but in the end acknowledged white supremacy and were confined to scattered reservations west

of the Mississippi. To-day, there are about 90,000 Algonquians in existence, of whom about 40,000 live in the United States and the remainder in Canada.

Corn was a great staple among the Algonquians, who cultivated the soil about their permanent homes of bark and logs. Among the chief tribes of this family are the Algonquin, whose name has been adopted for the entire stock, the Abnaki, Micmac, Passamaquoddy, Narraganset, Pequot, Delaware, Ottawa, Chippewa, Cree, Miami, Illinois, Kickapoo, Shawnee, Potawatomi, Arapaho, Menominee, Sauk, Fox, and Cheyenne. The greatest chiefs of the Algonquians were King Philip, Pontiac, Tecumseh, and Black Hawk, and the largest of the tribes named above were the Chippewa and the Cree.

Athapascan, *ath a pas' kan*, a widely distributed family of North American Indians who were scattered over that vast region of Western Canada and the United States from Alaska as far south as New Mexico and Arizona. There were three main divisions. The Northern group occupied the region of Alberta and Northwest Canada to Alaska, and lived by hunting and fishing; the Pacific group occupied

permanent villages along the western coast in Oregon and California; the Southern division lived in isolated groups in New Mexico and Arizona. Such important tribes as the Apache and the Navaho are members of this family, which exhibited throughout a greater similarity in language than in tribal manners and customs.



ORIGINAL ALGONQUIAN TERRITORY

The various tribes were located approximately in the sections indicated:

- | | |
|------------------|-----------------|
| (a) Chippewa | (g) Potawatomi |
| (b) Sauk and Fox | (h) Miami |
| (c) Kickapoo | (i) Powhatan |
| (d) Illinois | (j) Delaware |
| (e) Shawnee | (k) Pequot |
| (f) Ottawa | (l) Narraganset |

With the exception of the two tribes named above, they have not been warlike. In general, the Athapascans always showed a strong tendency to adopt the civilization of any other tribes with whom they came in contact, and missionaries found this imitative faculty of great help in dealing with them. Their clothing largely was made of deerskin and hair, and their lodges of deer or caribou skins, sometimes replaced by bark in the South. There are, at the present time, about 50,000 Athapascans living in the United States, Canada, and Alaska.

Aztec, a nation of Mexican Indians. See **AZTEC**.

Caddoan, a linguistic family, comprising three geographic groups. The Northern lived in North Dakota, and was known as the Arikara; the Middle group was the Pawnee, localized for a long time in Nebraska; the Southern, including the Caddo and Wichita, was scattered throughout Northern Louisiana, Arkansas, what is now Oklahoma, and in parts of Texas.

Creeks, *kreeks*, one of the strongest old Indian confederacies south of New York, consisting of several tribes, of which the Muskogee

was largest and most influential. The Creeks occupied most of Alabama and Georgia, in over fifty villages, spoke seven languages, and took their name from the large number of streams in their country. They were an agricultural people, but were also warlike. Their country bordered upon the English, Spanish, and French settlements, and each of these nations tried to gain their friendship. They favored first one, then another, until the English became supreme. During the Revolutionary War, they fought with the English, and after the war, many Tories settled among them and caused them to continue their hostility toward the United States. In the War of 1812, part of them became openly hostile, bringing on the Creek War of 1813, during which they caused the massacre at Fort Mims. The Creeks were severely punished.

In 1832 they sold all land left to them east of the Mississippi River and removed to Indian Territory, where, for a time, they resisted all attempts to civilize them. During the War of Secession, they furnished men to both armies, but those favoring the Union cause were driven into Kansas, where many perished. Most of the Creeks now reside in Oklahoma, though there are a few small groups in Alabama and other states. They number about 6,900 of pure Indian stock, but there are many among them of a mixed race.

Five Civilized Tribes, the name given to the Indians belonging to the Cherokee, Chickasaw, Choctaw, Creek, and Seminole nations in the former Indian Territory, now a part of the state of Oklahoma. They were given this name in government reports as early as 1876, because of their readiness to adopt civilized standards.

These tribes were gathered mainly from the Southern states east of the Mississippi River, and were transferred to the reservation in Indian Territory in 1838 and the years following. For many years, they were allowed practically to govern themselves, as though they were small republics under United States protection. Each tribe admirably made its own laws, elected its own officials, and conducted its own courts and schools. The tribal government was similar to a state government, with a governor, or principal chief, at the head, and a council composed of two houses, known by the peculiarly Indian names of *house of kings* and *house of warriors*. All land was owned by the respective tribes in common.

Some time after the War of Secession, this tribal organization did not continue so successfully, and the government came to see the necessity of bringing the Five Civilized Tribes under its direct control. The principal reason for this was that many whites had come into the Territory and were asking for a share in the government, from which, as non-Indians, they

were excluded. A contributing cause was that, since United States laws were not in force in the reservations, many criminals were evading justice by escaping to its borders. A further object was to meet the demand on the part of the country in general that unused lands be opened for settlement.

In 1893 the government took the first step toward the new order by appointing the Dawes Commission to work among the Indians, persuading them to allow their property to be divided among the individual members of the tribe, and to accept United States citizenship. This work was carried on with success. In 1897 Federal courts superseded the old Indian courts, and the following year, Congress provided, through the Curtis Act, for a commission to take the census of each tribe and to make fair division of its lands. The enrollment was finished in 1907, showing nearly 75,000 heirs to the vast estate of twenty million acres. It required several more years, however, to make the allotments of land. The division has left many of the Indians extremely wealthy, for their holdings include not only very fertile farming land, but valuable oil and coal fields. This wealth has been the cause of much intermarriage between whites and Indians, and at the present time, only about a third of the members of the Five Civilized Tribes are full-bloods. The total membership of the tribes is now about 60,000.

Five Nations, a confederacy of Iroquoian tribes which formed one of the most remarkable primitive governments ever known. It was organized in what is now the western part of New York state, about the year 1570, by a chief of the Mohawks called Hiawatha, and included the chief's tribe and the Cayuga, Oneida, Onondaga, and Seneca. In 1722 the Tuscarora were added, and thenceforth the confederacy was known as the Six Nations.

The organization was originally a defensive alliance against neighboring tribes. It had no executive, but was governed by a general council of the chiefs and sub-chiefs of each tribe, and did not interfere with local government. It appointed two war chiefs. So effective was the coöperation of the five tribes that, although outnumbered by neighboring enemies, they advanced their borders and made their influence felt as far as the Mississippi River. But for the arrival of white men, their sway might have been extended over the whole of the East, and they might have laid the foundation of a true Indian civilization by diminishing warfare.

Cartier, in 1534-1535, was the first white man to be seen by these Indians, and seventy years later, Champlain aided the Algonquians against them. As a result, they allied themselves with the English against the French. In the Revolutionary War, most of the tribes fought for

the English, though the league was officially neutral. Afterward, some of them were given homes in Canada. Of those remaining in the United States, the Oneida are in Wisconsin and New York and a few of the Seneca are in Oklahoma; the rest are on reservations in New York.

Huron, or Wyandotte, *wi' an dot*, a powerful confederation of Indian tribes whose original home was in Canada, between Lake



Photo: Visual Education Service

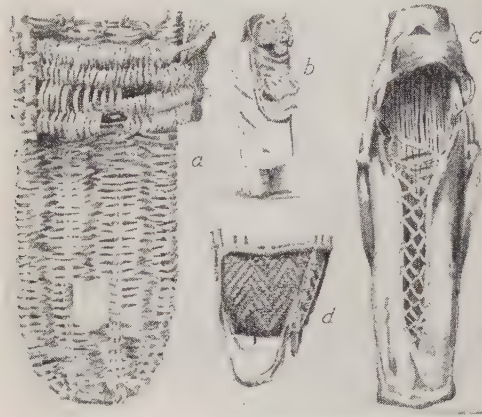
THE "CRADLE" OF A PAPOOSE

There were no baby carriages among the Indians. Mothers carried their babies in such contrivances as the above, which they strapped to their backs when at work. Some of these cradles were made of softest leather and were richly decorated with beadwork.

Simcoe and Georgian Bay. The name is French, and means *bristly*, or *rough-haired*. When the Hurons were first known to the French, about 1615, they were a well-organized people numbering about 10,000. The chiefs were elected in a unique manner, by the vote of all the mothers of the tribe. Their councils were divided into legislative and judicial bodies, and their military affairs were entirely separate from both of these. The blood feud was sacred among them, and revenge for injury or insult was a first duty. They were

bound to respect the property, dignity, and liberty of each other, but not necessarily those of another tribe. Although they had a well-defined religion of their own, which embraced the worship of all material objects, they received kindly the Jesuit priests who established missions among them.

After many years of bitter warfare with the Iroquois, the Hurons were forced to leave their Canadian home. They fled southward, finally



OTHER CRADLES

(a) Moki wicker cradle. (b) Apache woman carrying child. (c) Ute cradle. (d) Arikara carrying-basket for the papoose.

The illustrations are drawn from specimens in the National Museum of the United States, at Washington.

reaching the Mississippi River, from which they were driven back by the Sioux. In 1751 they settled on the site of the present city of Sandusky, Ohio, and were there known by the name of Wyandotte. About 300 now reside on a reservation in Oklahoma; a few hundred live in Ontario and Quebec.

Inca, a great family of Peruvian Indians. See INCA.

Iroquoian, *ir o kwoi' an*, one of the most important groups of North American Indians, whose stock name is derived from that of the Iroquois, who figure so largely in early American history. They comprised a league of five tribes—the Mohawks, Oneidas, Onondagas, Cayugas, and Senecas, and later were joined by the Tuscaroras. To them the English applied the names "Five Nations" and "Six Nations." According to legend, the five tribes were persuaded to form a confederacy by their great chieftain, Hiawatha, whom Longfellow has made the hero of his poem of that name. (See *Five Nations*, above.)

The Iroquois Indians were settled in Central and Western New York when, in 1609, they were found by the French explorer Samuel Champlain. Unfortunately for France, he

made friendly overtures to their enemies, the Algonquians, and in the subsequent wars between France and England, the Iroquois lent powerful aid to the latter nation. During the American Revolution, all of the Iroquois except the Oneidas and a few of the Tuscaroras aided the English, and the Mohawks and Cayugas, led by Joseph Brant, went to Canada. Nearly all of the surviving Iroquois in the United States are on reservations in New York; the majority, in Canada, live on the Grand River Reservation, Ontario. Their number in all about 17,000.

These Indians were above the average in intelligence. They had organizing ability of no mean order, lived in well-built bark-covered houses, and were skilled agriculturists, basket-makers, and potters.

Muskhogeans, *mus ko je' an*, an important linguistic group, forming a confederacy composed of the Creeks, Choctaws, Chickasaws, Seminoles, and others less important. Formerly, they ranged all over the state of Mississippi, Western Tennessee, Eastern Kentucky, Alabama, and Georgia, and later wandered through Florida. When the Spaniards landed on the Gulf coast, in 1527, they found the Muskhogeans living in fortified villages, engaged in agriculture. They were much more intelligent and progressive than any other Eastern tribe, with an elaborate social organization, each tribe living in a separate village. There were about 50,000 of them at that time, but to-day they number about 35,000, and are largely in Oklahoma.

Pueblo, *pweb' lo*, the Spanish word for *village*, was applied by early Spanish explorers to all those Indians in the Southwest who lived in communities of adobe or stone houses. The fact that they built permanent dwellings set them apart, in the minds of the explorers, from the less advanced tribes of that region. There are hundreds of ruins of pueblos in Southwestern United States between Colorado and Utah and the Mexican border, and there are several occupied settlements in New Mexico and Arizona. The early Pueblos built their villages on the sides or the tops of steep cliffs which could be reached only by narrow pathways, thus securing their homes from hostile attacks.

Since the Southwestern tribes have come under the protection of the United States government, the Pueblos for the most part have come down to the plains, but one tribe, the Hopi, still dwells on the tops of high mesas. A typical Indian pueblo is an aggregation of many houses built one above the other, terrace style, the different stories being reached by means of ladders. The Pueblos are industrious tillers of the soil, and raise good crops of corn and vegetables. Many have practiced irrigation from an early period, and weaving, basket-

making, wood carving, and pottery-making have reached a high state of development among them. They number about 10,000, representing five linguistic families. The most important tribes are the Hopi and the Zuñi.

Shoshonean, *sho sho' ne an*, a great family which originally occupied a vast territory between the Rocky Mountains and the Sierra Nevadas. To this group belong the Hopi, the only Shoshonean tribe that settled in permanent villages and followed the arts of weaving, pottery, and agriculture. The other tribes lived a wandering life, obtaining a food supply by hunting, fishing, and gathering seeds and roots. The Utes and Banaks were the most warlike of the Shoshoneans. The group numbers about 15,000.

Siouan, *soo' an*, next to the Algonquian group, the largest linguistic family of Indians north of Mexico. The largest tribal group of Siouan Indians is the Sioux, or Dakotas. The principal body formerly ranged along the west bank of the Mississippi, northward from the Arkansas, and nearly to the Rocky Mountains. They also ranged northward for some distance into Canada in the direction of Lake Winnipeg. The first known meeting of these Indians and the whites was in 1541, when De Soto reached Quapaw villages in what is now Arkansas. The Eastern tribes lived in wigwams of bark and mat, but the bands on the Plains lived in tepees made of earth and skins. The principal tribes of the Siouan family are the Omaha, Sioux, Winnebago, Assiniboin, Osage, Ponca, and Quapaw, but there are numerous others. The Sioux, or Dakotas, were the most hostile to the white settlers of any of the Siouan groups. The entire group now numbers about 40,000.

Most Important Tribes

Apache, a *pah' chay*, but commonly pronounced a *patch' e*, the Zuñi Indian word for *enemy*, is applied by the Zuñi especially to the Navahos (who are closely related to the Apaches), with whom they were almost continuously at war. The Spaniards adopted the name to designate a number of warlike In-

dians of Northern Mexico and the territory now included in New Mexico and Arizona. The true Apaches belong to the great Athapascan family. They were among the most powerful tribes of the Southwest, and were constantly raiding the white settlements, as well as the weaker Indian tribes on both sides of the Mexican borders.

Their feelings toward the United States were not unfriendly until after the Mexican

War, when several unprovoked attacks on them led to a change of attitude. There was hostility of varying degrees until 1860, when warriors of a number of the Apache tribes went on the warpath. Except in the neighborhood of Tucson, they practically drove the white men out of Arizona in the next five or six years. In 1886 several bands of Apaches, principally of the Chiricahua tribe, went on the warpath for the last time. After causing much loss of life and property, they were captured, and their leader, Geronimo (Spanish for *Jerome*), and many others were imprisoned. Over 4,000 Apaches now live on reservations in Arizona and New Mexico,



Photo: Keystone

A PUEBLO YOUTH OF TO-DAY

but a band of about 270 is in Oklahoma. They make excellent baskets, and since their decisive defeats, have taken kindly to the white man's civilization.

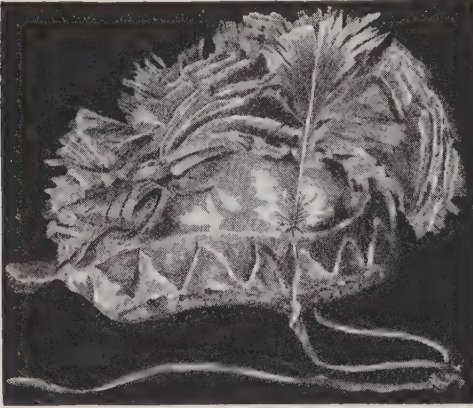
Arapaho, a *rap' ah ho*, an Algonquian tribe whom the Cheyenne call "Blue-sky men" or "Cloud men." This was formerly a large tribe of the Plains, but now they number only about 1,800. They are a brave, kindly, and accommodating people, much given to observing ceremonies. Before they were known to white men, the Arapaho were supposed to have lived in the valley of the Red River of the North, in Minnesota; later they moved westward into Wyoming, and subsequently a part of them were placed on a reservation with the related Cheyenne in Oklahoma, where they are now farmers. Those in Wyoming are still on a reservation.

Arkansas. See QUAPAW.

Assiniboin, a *sin' ih boyn*, which means *one who cooks by stones*, is the name given to an Indian tribe of the Siouan family, be-

cause when first known by white men, they boiled water by dropping hot stones into it. They lived between the Missouri and Saskatchewan rivers, on both sides of the Canadian border. About 1,250 are now on reservations in Montana, and a slightly larger number live in Canada.

Bellacoola, *bel' la koo' lah*, a tribe which suffered more than most Indians from contact with white settlers. Their home is now in



AN APACHE WAR-BONNET

Worn by the "braves" on their exploits as late as 1866.

British Columbia. They were once strong and important, extending their range into the Northern United States, displaying unusual skill as fishermen, and building great houses which were marvels of strength and ingenuity. The Bellacoola number now only about 300.

Blackfoot, a tribe supposed to have received its name from white men who noticed that the tops of their moccasins were blackened by the burnt grass and brush through which they passed. The Blackfoot are a branch of the great Algonquian family, and formerly occupied all the region from the North Saskatchewan River in Canada to the headwaters of the Missouri in Montana. They were restless, aggressive, and frequently at war with other tribes, but never with the United States or Canada. They became noted for their large herds of horses. They now live on reservations in Alberta and Montana, where they are acquiring the customs of civilization. In all they number about 4,700. Tourists in Glacier National Park and in Rocky Mountains National Park, north of the former, in Alberta, may see many camps of these Indians.

Catawba, *ka taw' bah*, a formerly powerful tribe of the Siouan family who lived along the Catawba River in North and South Carolina. When first known, they were the most important Indians south of the Ohio River, next to the Cherokee. They were agriculturists, but were constantly at war with the Iroquois and other

Northern tribes. They favored the British in the French and Indian War, and aided the Americans in the Revolution. War, disease, and dissipation caused their numbers rapidly to decrease from an early total of 4,600, until now but about 100 remain; these live on a reservation in South Carolina.

Cayuga, *ka yoo' gah*, a tribe formerly living on the shores of Cayuga Lake, New York. The name means *swamp dwellers*. The Cayugas were of the Iroquoian confederation and belonged to the Five Nations (see above). They were the last to join this confederation, and were known as the *Youngest Brother*. At the beginning of the Revolutionary War, a large part of them removed to Canada and never returned; the others became scattered among other tribes. About 800 of them now live on Grand River Reservation in Ontario. Their early numerical strength was about 1,500.

Cherokee. When Fernando De Soto made his famous expedition to the Mississippi River in 1539-1540, he passed through the territory of a tribe of Indians more nearly civilized than any other that he had found. They were described as living in log houses and tilling the land. These Indians were the Cherokee, a branch of the Iroquoian family and one of the most important tribes east of the Mississippi. They formerly occupied all the mountain region of the present states of West Virginia, North and South Carolina, Tennessee, Alabama, and Georgia. The name is said to mean *cave people* in the Choctaw language, because there were so many caves in the region they occupied. Before the Revolutionary War, they were in frequent conflict with the settlers in Southern colonies, and during the war, they favored the British.

In 1785 the Cherokee made a treaty with the United States. Their independence was acknowledged, and their title to the lands they occupied was confirmed. From that time the tribe made rapid progress in civilization. In 1820 the Cherokee Nation was organized, and a few years later, a constitution modeled after that of the United States was adopted. Schools were established, and Sequoyah, a half-blood, invented an alphabet which soon enabled them to read in their own language. In 1827 they established the first Indian printing press in the United States, and the next year began the publication of the *Cherokee Phoenix*, the first Indian newspaper. Meanwhile, gold had been discovered in their territory, the inhabitants of Georgia were clamoring for their land, and notwithstanding the treaty which the United States, under President Jackson, had made with them, they were compelled by force to give up their homes and remove to Indian Territory, where some of their number had previously gone. The



Photo: Visual Education Service

A CONFERENCE IN OKLAHOMA

A present-day group of Cherokee and Choctaw Indians.

journey was made on foot, and during it many lost their lives through hardship. During this time of trial, their great leader, John Ross, accompanied them and shared their sufferings. (Some of the Cherokee refused to be removed from their ancestral home, but fled to the mountains. The descendants of these, numbering about 1,700, live in Western North Carolina.)

Arriving at their destination, they reestablished the government and made Tahlequah the capital. Just as they had regained something of their former prosperity, the War of Secession broke out, and again they faced disaster. Some sided with the South, others with the North, and the nation furnished soldiers to both the Confederate and the Federal armies. During the war, the country was ravaged by hostile forces; at the close of the war, the Cherokee made a new treaty with the United States, which freed the slaves they had held, and adopted them as citizens. Schools were reestablished and industries were revived. As prosperity continued, the Cherokee became a civilized and thriving people. In 1892 they sold their western territorial extension, and in 1906 they gave up their government and became citizens of the United States. Many of them are among the most prosperous, influential, and cultured citizens

of Oklahoma. They number about 20,000. (See, above, *Five Civilized Tribes*.)

Cheyenne, *shi en'*, or *she en'*, a Plains tribe belonging to the Algonquian family. When first known to white men, they lived in Minnesota, north of the Minnesota River, but were gradually driven westward into the present states of South Dakota, North Dakota, and Montana. They have always been a strong, brave people, who have held women in high regard. When first known, they lived in villages and cultivated the land, but later they became the most skilful and daring Indian riders of the Plains. In 1832 a portion of the tribe removed to Arkansas and became known as the Southern Cheyenne. Their treatment by the whites was unjust, and from 1860 to 1878, they were actively engaged in border warfare. In 1876 they took a prominent part with the Sioux in the Battle of Little Big Horn, in which General Custer and all his men were slain. They have since become friendly. The Southern Cheyennes are located in Oklahoma, where they live upon farms. They have become civilized and have been admitted to citizenship. The Northern branch is on a reservation in Montana. In all, they number about 3,500.

Chickasaw, an important tribe of the Muskogean linguistic group who formerly lived in

the northern part of Mississippi and the western part of Tennessee. They were closely related to the Choctaw in language and customs. These Indians were first noted by Fernando De Soto in 1540. When he attempted to make some of them work for him, they attacked him and he lost several men. The Chickasaws were a powerful and quarrelsome tribe, and almost constantly at war with other tribes. They were opposed to the French, and favored the English in the struggles of those nations for possession of territory in America.

The Chickasaws were always friendly to the United States. As civilization advanced, they began to remove westward, and in 1834 sold all their remaining land east of the Mississippi and removed to the western part of Indian Territory, where they bought land of the Choctaws, and became the Chickasaw Nation, civilized and prosperous.

Chinook, a tribe in early days numbering over 16,000 members, who formerly lived in the southwest corner of the state of Washington, occupying the territory from the mouth of the Columbia River to Gray's Bay, a distance of about fifteen miles, and northward along the seacoast as far as the northern part of Shoalwater Bay. They first became known through the expedition of Lewis and Clark, 1803-1806. The Chinooks were tall, with broad faces. All tribes of the family practiced the custom of artificially flattening the head. They became great traders, exchanging goods with both native tribes and white men. Their number has been reduced to about 600, on reservations in Washington and Oregon.

Chippewa. See *Ojibwa*, below.

Choctaw, *chok' taw*, formerly one of the most powerful of the Muskogean tribes, once living south of the Ohio River, numbering about 20,000 two hundred years ago. When first known to Europeans, they occupied the central and southern part of Mississippi and that portion of Alabama west of the Tombigbee River. They were farther advanced in agriculture than most other tribes, and lived in permanent dwellings. They were a brave people, and most of their wars were in defense of their lands against the Chickasaw and the Creeks. De Soto entered the territory in 1540, captured one of their chiefs, and was compelled to resist a fierce attack. They had the custom of flattening the heads of their children by placing bags of sand upon them, and from this custom obtained their name, which means *flathead*.

When the French began settlements along the Mississippi, the Choctaws became friendly with them and frequently assisted them in their wars against other tribes. After the French and Indian War, they began to remove to lands west of the Mississippi. After the Revolutionary War, they signed a treaty with

the United States in which undisturbed possession of the land was guaranteed them. They aided the government in the Creek War of 1813, and in 1832 sold all their land east of the Mississippi and removed to Indian Territory, where they established the Choctaw Nation with an organized government. Like all Southern tribes, they were slaveholders, and suffered from the War of Secession. Since then they have continued to advance in wealth and civilization, though they are reduced to about 17,000 in number. They live in Oklahoma. (See *Five Civilized Tribes*, above.)

Comanche, *ko man' che*, a tribe of Indians closely related to the Shoshoni of Wyoming. When first known, they occupied Eastern Colorado and the territory southward to the boundary of Mexico. They were among the most skilful and daring horsemen of the Plains, and were extremely warlike, being constantly at war with the Spaniards. When Texas became independent, they were driven from their best hunting grounds, and for years waged war on the Texans. Later, they engaged in border warfare with the United States troops, and it was not until 1875 that they surrendered and were placed on a reservation in Western Oklahoma, where they now live. They are slowly decreasing, numbering now about 1,100.

Conestoga, *kon es to' gah*. When Captain John Smith and his followers reached the region of Chesapeake Bay, in 1608, they found there a tribe of Indians, the Conestoga, 3,000 in number, who were taller and better built than any of the neighboring tribes. They were strong and warlike, too, but were unable to hold out against the Iroquois, by whom they were defeated in 1675. They sought new homes, but were not allowed to remain in peace, and were in time reduced to a pitiable remnant. The survivors, then twenty in number, were massacred by a mob in 1763.

Cree, *kree*, a tribe belonging to the Algonquian family and living in Canada, where they formerly occupied a large portion of Manitoba and Saskatchewan, extending their territory northward to Athabaska Lake. They always were friendly with the whites, and retained trade relations with the Hudson's Bay Company (which see) from the date of its organization. As civilization encroached upon them, they sold their lands to the Canadian government; about 10,000 are now on reservations, and possibly 5,000 scattered throughout Northwest Territories.

Crow, a tribe belonging to the Siouan group. They formerly occupied the valley of the Big Horn River and later the country about the headwaters of the Yellowstone, in Northwestern United States. They were skilful horsemen, and continually at war with surrounding tribes. The women excelled in the



Pleasing Aspects of Indian Life. Little Lone Star in charge of his papoose brother, both under the eye of their adoring mother. The picture was taken in the Blackfoot Reservation, in Glacier National Park. At right, an Indian artist. True to the traditions of his race, he prefers animal subjects rather than the beauties of nature.



Photo: U & U

A MODERN CROW INDIAN CAMP

Every year members of this tribe in Montana meet for celebration of the Fourth of July. Until recently, they journeyed in light wagons, but now automobiles are the vogue. The large building in the upper right of the illustration is an assembly hall, where council meetings are held.

manufacture of ornamented wearing apparel. They now number about 1,800, and live on a reservation in Montana.

Delaware, a tribe belonging to the Algonquian family, living, when first known, on the Delaware River. They called themselves *Lenni Lenape*, which meant *real men*. They occupied Eastern Pennsylvania and most of New Jersey. It was with these Indians that William Penn made his celebrated treaty, and from their great chief Tamanend, the Tammany Society (which see) of New York takes its name. Because they occupied the central home of the Algonquians, they were given the title of *grandfather* by all the tribes of that great family. Driven from their original home by the progress of the whites, they removed westward, about 700 reaching Texas. Fewer than 1,900 now remain, and they are scattered among other tribes.

Flatheads, the popular name for several small tribes who, it has been declared, followed the unusual custom of flattening the head.

Fox, a tribe of Algonquian stock, called in their own language *Meshkwakihug*, or *Red-Earth People*. Their familiar name, Fox, was given them by the French. When first known to the white man they were living in Central Wisconsin, having been driven there from the Lake Superior region by the attacks

of the Ojibwa. In order to protect themselves from this tribe and from the French, they united with the Sac Indians about 1760, and the two tribes have since then been practically one. They are scattered over Oklahoma, Iowa, Kansas, and Nebraska, and number about 500.

Hopi, *ho' pe*, the present-day designation applied to a tribe formerly known as the Moqui Indians. This was an interesting and once powerful tribe of North American Indians, about 2,200 of whom are now living in North-eastern Arizona. There, hundreds of feet above the desert, on *mesas*, or rock "tables," reached by steps and difficult trails, they have their terraced stone *pueblos*, or villages. Of the seven villages which they occupy, Walpi and Oraibi are the principal ones. Another town, called Hano, is inhabited by the *Tewa*, a similar tribe of 160 members.

The Hopi are a small, muscular, and agile people. Like all Indians, they have straight, black hair. Hopi men sometimes wear their hair "banged" in front, cut short at the sides, and tied in a knot behind. They now wear calico shirts, short pantaloons, leggings, moccasins, hair bands, and jewelry of shell, turquoise, and silver. Married women wear their hair in two coils hanging down in front; all girls on reaching the marriageable age, at about fourteen, until recently dressed theirs in whorls



HOPI, OR MOQUI, MAN AND WIFE

at the sides of the head, but the practice is not now universal. All of the women wear dark-blue woolen dresses of native weave, fastened with embroidered belts, and calico shawls draped over the shoulders, deer-skin moccasins, and various pieces of silver jewelry.

The Hopi are keen, industrious, and peace-loving, and lead upright lives. Their language is Shoshonean. They are skilled in pottery- and basket-making, weaving, dyeing, and embroidering, and articles which they make find a ready market among neighboring tribes and among tourists. They raise large quantities of maize, and store about a third of the crop each year against possible future needs. Peaches, beans, melons, pumpkins, cotton, wheat, and tobacco are also cultivated by them. Flocks of sheep and goats supply their wool and skins, and they possess cattle, horses, burros, and mules.

Like the other Pueblo Indians, the people of this tribe believe in witchcraft, and many of their customs and ceremonies are strange and interesting. Their snake dance is an especially weird performance, the Indians dancing with live snakes between their teeth. The Hopi first became known to white men in 1540. Studies made of mounds and ruins show that, at one time, villages of the Hopi extended as far north as the Colorado River, west to the vicinity of

Flagstaff, Ariz., and south to the Little Colorado Valley and probably beyond.

[The term *Moqui* is of undetermined significance and of alien origin; the Hopi insist that it does not apply properly to them, and that the word means *dead* in their language. To other tribes and to the early Spaniards, the tribe has been known as Moqui for over two centuries.]

Illinois, the collective name of six small but distinct tribes belonging to the Algonquian family. At one time they occupied the territory that is now included in the states of Illinois, Iowa, Michigan, and Missouri; the six tribes were the Cahokia, Kaskaskia, Michigamea, Moingwena, Peoria, and Tamaroa. They became the friends of La Salle during his explorations in the Mississippi Valley; and during the French and Indian Wars, it was therefore natural that they should help the French. They regarded the advance of the English settlers with hostility, and were subdued only after many wars had been waged against them. Especially did they suffer in their conflict with the Ottawa Indians, who fought them to avenge the murder of Pontiac (which see). The remnant of the tribes, numbering fewer than 200, live on a reservation in Oklahoma.

Inca, a family of South American Indians. See INCA.

Iowa, a tribe belonging to the Winnebago stock, who carried on an active fur trade in

Minnesota after the whites settled in the country. Afterward, they settled in the region a part of which to-day bears their name, and in 1836 they were given land on the west bank of the Missouri River, in what is now Kansas. At the time of the War of Secession, they removed to reservations in Kansas and Oklahoma, where the remnant of the tribe, numbering fewer than 100, now live. They were an agricultural people and given to hunting the buffalo.

Kansa, or Kaw, a tribe belonging to the Siouan stock, and an offshoot of the Osage. They were driven from their original home in Missouri into Kansas by the Dakotas, and drifted from one reservation to another until they settled in what is now Oklahoma, in 1873. They now number about 200. In the days of their primitive strength of about 1,500, they were active in hunting the buffalo.

Kickapoo, *kik' ah poo*, a tribe of Algonquian Indians, who formerly occupied reservations in the Ohio Valley and were prominent in the history of that region until 1819, when they removed to Missouri and afterward to Kansas. About 1852 a large number of the tribe went to Texas, then to Mexico, and in the border settlements their native warlike spirit made them so turbulent that the government made efforts to have them return; consequently, in 1873, about half the number removed to the north and settled in the present state of Oklahoma. They were successful agriculturists. There are only about 600 Kickapoo Indians surviving, and of these, 180 are in Mexico.

Kiowa, *ki' o wah*, a tribe whose range was formerly along the Arkansas and Canadian rivers in Indian Territory (now Oklahoma), Colorado, and New Mexico. They were very hostile to the whites, and made repeated attacks on the settlers in Western Texas until, in 1868, they were confined on a reservation in the present Oklahoma. In 1874 they became troublesome again, but in the following year were fully subdued. About 1,100 survive.

Klamath, *klah' mat*, the collective name of several tribes whose original home was along the Klamath River in Oregon and California. By a treaty negotiated in 1864, they were given their present reservation along Klamath Lake, at the base of the Cascade Range, covering 1,360 square miles. The Klamath formerly ranged over the whole of Northern California, and numbered among their tribes the Shastas and the Modocs. They were always at peace with the whites, in this respect differing from the related Modoc tribe. About 700 are now living.

Kutenai, or **Kootenay**, *koo' te nay*, a small group constituting the distinct linguistic stock of Kitunahan. Their former home was in the valleys along the Kootenay River and the Arrow Lakes, north and south of the boundary

between British Columbia and Montana. They now live on reservations in the same regions. The Kutenai have long been noted for their honesty and their friendliness to the white people. There are about 400 in British Columbia, and about 450 on the Flathead Reservation in Montana.

Makkah, or Makaw', the only tribe of North American Indians called *Cape Indians*, although other tribes once lived on promontories. Their tribal name, Kew-net-che-chat, means *cape people*. The Makkahs lived in the region along Puget Sound and the Strait of Juan de Fuca, on Cape Flattery. They excelled in the management of canoes and were bold and daring fishermen, venturing farther from land in search of fish than any of the neighboring tribes. Formerly, they were a warlike tribe, but are now civilized and live upon two small reservations on the cape. The women are expert basket-weavers. They number fewer than 350.

Mandan, a vigorous tribe of Siouan stock, which has been almost wiped out by epidemics of smallpox and by old-time raids by the Sioux. Little is known of their early history except that they were gradually crowded north along the Missouri River, and finally, in 1837, were reduced to one village on the Knife River. In 1870 they were living near the mouth of the Heart River, a tributary of the Missouri. Only about 200 yet remain, and they live on the Fort Berthold Reservation in North Dakota. While they were yet free, their houses, built of logs, were low and circular, roofed, and chinked with mud and grasses. Great herds of buffalo on the Plains supplied them with meat and warm robes for the long, cold winters. The dressed hides, when stretched between posts, made comfortable beds; placed over willow frames, they formed queer, tub-like canoes. The Mandans raised beans, corn, sunflowers, and tobacco.

Menominee, *me nom' ih ne*, a tribe belonging to the Algonquian stock, resembling the Ojibwas, but with a distinct language of their own. Their home formerly was in Wisconsin and Northern Michigan, and they were found by Nicolet in 1634 at the mouth of the Menominee River. The French established a mission among them in 1670, but during the Revolutionary War and the War of 1812, they aided the English. They now live on a reservation in Wisconsin, and number about 1,400.

Modoc, *mo' dok*, a small group with close linguistic relation to the Klamath tribe, and living originally on the rich lands about Lake Klamath and the Lost River Valley, in Northern California and Southern Oregon. Their name means *aliens*, and it was applied to them by a neighboring tribe. Their bitter struggles against the white settlers and their raids upon neighboring tribes for slaves earned them the



Present-Day Scenes. The squaws do the work, as they have done for hundreds of years, while the braves "sit around." At right, a pair of lovers. He sits, by right of centuries of custom.

reputation of being a hostile, warlike people. The women were expert basket-weavers. Their homes were mud-covered huts built of timbers, sometimes well hewn. After a number of treacherous dealings on both sides, these Indians were subdued by United States troops and confined on the Klamath Reservation in Oregon, and on a reservation in Oklahoma. They number fewer than 300.

Mohave, *mo hah' vay*, a tribe of notably fine physique and appearance, who lived along the lower Colorado River in Arizona and California. They cultivated patches of corn, pumpkins, melons, and beans, and also gathered the natural mesquite beans for food. Their houses were low-walled huts with flat tops, built of brushlike mats between four corner posts. They cremated their dead. Tattooing was the universal practice. The Mohave live on four reservations in the Southwest, and number about 1,400.

Mohawk, the oldest and, during colonial times, the most powerful tribe of the Iroquois confederacy, or Five Nations (see above). Their territory, when white men first knew them, was along the valley of the Mohawk River, in Eastern New York; from there it extended northward to the Saint Lawrence and southward to the east branch of the Susquehanna. Just east of the Mohawk, across the Hudson, were the Mohican, who were their enemies. They were the first tribe to come in contact with the Dutch and English settlers; with these they traded and received firearms in return for pelts. Their central position exposed them to all the waves of warfare during the stormy colonial period, and by 1677 their villages were reduced to five. They joined the British in the American Revolution, and at its close, most of them went to Canada, where they were established on reservations.

Mohican, *mo he' kan*, or **Mahican**, one of the most powerful tribes of the Algonquian family, who dwelt along the Hudson River in New York. They were bitter enemies of the Mohawks, with whom they were in almost constant warfare, and whose attacks led them to move their council fire to the site of the present Stockbridge, Mass. Gradually losing their tribal identity, a remnant, known as the Stockbridge Indians, are now settled upon a reservation in Wisconsin. The Mohicans were renowned fighters, resorting to craftiness and deceit, fighting from ambush and in the dark rather than in the open. Cooper has told their thrilling story in *The Last of the Mohicans*. They were a well-built people, strong and wiry. Their curious houses, sometimes 180 feet long and nearly twenty feet wide, were made by planting two parallel rows of saplings, whose tops were bent over to form the roof, the outside being covered with split poles and bark.

Munsee, *mun' se*, one of the three principal divisions of the Delaware Indians, the others being the Unami and Unalachtigo. The Munsees were frequently called the Wolf tribe of the Delawares, because the wolf was regarded as their tribal symbol (see TOTEM). They themselves were in early times divided into several bands, the most important being the *Minisink*, whose name comes from an Indian word meaning *at the place where stones are gathered together*. They formerly occupied the land about the headwaters of the Delaware River in New York, New Jersey, and Pennsylvania, and also had control of an extensive tract along the west bank of the Hudson River. The Munsees who dwelt on the Hudson were conspicuous in early New York history, but when the white settlements increased, they joined their relatives along the Delaware. By a fraudulent treaty, known as the *Walking Purchase*, the majority of the Munsees were driven from the Delaware about 1740, and settled on lands along the Susquehanna River, which were assigned to them by the Iroquois. They are now widely scattered throughout the United States and in Canada.

Narraganset, *nair a gan' set*, a powerful tribe of Algonquian stock who lived in colonial times in what is now Rhode Island, west of Narragansett Bay. They made friends with Roger Williams, but in 1675 joined the armies of King Philip, the son of Massasoit. In a great battle in a swamp near Kingston, R. I., nearly one thousand Narragansets were killed, and the rest of the tribe was later scattered among Indians of the North and West. The few who survive are not pure-blooded Narragansets.

Navaho, *nahv' a ho*, a tribe belonging to the Athapaskan stock, and known especially as the makers of the beautiful blankets that bear their name. Unlike the great body of Indians living in the United States and Canada, they are growing more numerous, their present number being estimated at 28,000. Most of them live within the boundaries of their great reservation of over 9,500,000 acres—a barren tract of rocks and sand in Southwestern Utah, Northeastern Arizona, and Northwestern New Mexico. The others roam the pasture lands outside, or are at work in neighboring white settlements. The men and women are alike industrious and live in peace and contentment, doing a little farming, making pottery, baskets, silver ornaments, and blankets, but supporting themselves chiefly by their herds of sheep, goats, cattle, and horses. They are a wandering people, each family changing its place of abode at will. At the same time, they build rather substantial homes—round huts made of earth-covered logs. They care little for the refinements of civilization, and have never accepted Christianity, but hold to their old-time cere-



Photo: P & A

THIS RED MAN HAS AN IMPORTANT MESSAGE

The picture is not intended to suggest American progress from the days of the Plains Indians to the magic of the radio. It has a strictly modern setting. Russell Hill, a young brave of the Tonawanda (N. Y.) Reservation, is speaking in his native Seneca tongue to Indian farmers from a Buffalo broadcasting station. He was appointed as assistant county agent in charge of corn-borer control, to teach methods of combating the borers, and he gave a series of instructive talks over the radio.

monies and mythology. Like most of the other members of the widely scattered Athapaskan family, they call themselves *Dine*, meaning *people*.

The Navahos were a source of trouble during the greater part of the period of Spanish occupation in what is now Southwestern United States, and for thirty years after the fall of Spanish power, between 1815 and 1845, they carried on the thriving business of stealing horses, cattle, and sheep from the Mexicans. From the Pueblo Indians they learned the art of weaving, and from the Mexicans that of working in silver. Their first treaty with the American government was made in 1846, but there was more or less friction with them until 1868, and in 1863 it was necessary to send Kit Carson against them. In 1868 they settled peaceably on the reservation allotted them.

Navaho Blankets are woven from the wool of the sheep herded by these Indians. The wool is washed, combed with coarse metal brushes, then worked into yarn on a spindle. The looms for weaving are similar to those used by other primitive peoples. Between two poles, set in the ground a short distance apart, are fastened two horizontal beams. Between these the warp is stretched. For a shuttle they use a blunt stick, and the weaving is begun at the bottom, the cloth being rolled on a long pole as the

work progresses. Dark blue, yellow, red, black, and white are the favorite colors, white and black wool being mixed to produce the much-used gray. The women become very skilful at weaving in certain designs. No two blankets are alike, for they do not work from any pattern or drawing, but plan as they weave. The Navahos are shrewd traders, and do not exchange their blankets and silver ornaments for beads and tobacco. Their blankets bring good prices.

Nez Percés, *na pehr sa'*, a peaceable tribe visited in 1805 by Lewis and Clark, while on their trip into the Northwest (see LEWIS AND CLARK EXPEDITION). They called these Indians Chopunnish, but the source of this name is unknown. *Nez Percés*, meaning *pierced noses*, was a name given by the French to tribes accustomed to piercing the nose, as many other people pierce their ears, in order to wear ornaments there, but it is not known that this tribe had such a custom. They lived in what is now the southeastern corner of Washington, Northeastern Oregon, and Western Idaho, in mountain valleys and along the banks of the Snake River. Their principal food was game, salmon, roots, and berries, and they did not engage in agriculture.

This tribe of Indians was usually friendly to white men. When gold was discovered in the

Oregon mountains, the United States endeavored to make a new treaty with the Nez Percés, who had already been confined to a reservation in Idaho. They refused the terms, and in 1877, under their chief, Joseph, defeated United States troops in a number of skirmishes. During this war, Joseph commanded his braves not to harm a white man who was not in the quarrel. He was finally overcome and attempted to retreat into Canada, but was surrounded, and he and his people, who thought they were going back to their old reservation, were taken to Indian Territory. So many of them died there that in 1884 they were sent north to Colville Reservation, in Northern Washington. There are fewer than 1,500 now living, and these are to be found in the two reservations in Washington and Idaho.

Ojibwa, *o jib' way*, or **Chippewa**, one of the most peaceable tribes of Indians, belonging to the Algonquian family. Formerly, they occupied large tracts of land about the upper Great Lakes, in Michigan, Minnesota, Ontario, Manitoba, and neighboring regions, and now dwell upon reservations in the same districts. Their Indian name, *Chipwayanwok*, means *tailskins*, and was given them on account of their dress, which had points hanging down before and behind. They are well-built people, tall and agile, and expert hunters and fishermen. They now number about 30,000, approximately 12,700 of whom live on Canadian reservations, the remainder in Minnesota, Wisconsin, Michigan, Kansas, and Montana.

Oneida, *o ni' dah*, a tribe who belonged to the confederation of Iroquoian tribes known as the Five (later Six) Nations (see above). Their home originally was along the shores of Oneida Lake in New York state. They were about the only tribe among the Iroquoians who fought with the Americans during the War of Independence. For this reason, the other tribes of the Iroquois, led by Joseph Brant (which see), attacked them, and they sought refuge in the American settlements until the war ended. Some returned to their former homes after the war was over, and others emigrated to the Thames River district in Ontario. Most of the tribe settled upon the reservation on Green Bay, Wisconsin, early in the nineteenth century, and adopted the customs of civilization. They now number about 3,000; about two-thirds of these live in Wisconsin, a few in New York state, and about 800 in Ontario.

Their proper name, *Oneyotka-ono*, meaning *people of the stone*, refers to a granite boulder on the shore of Oneida Lake, near the place where their original village stood.

Onondaga, *on on daw' gah*, a tribe belonging to the Iroquois stock, and forming one of the Five (afterward Six) Nations (see above). Their original home was along the shores of Lake Onondaga in New York state,

but they controlled territory as far north as Lake Ontario and southward to the Susquehanna River. They were the official guardians of the council fire of the Iroquois. In the eighteenth century, some of the tribe were converted by French missionaries and migrated to the Roman Catholic Iroquois settlement in Canada. The rest remained in New York and loyally supported the Iroquois league. After the War of Independence, the majority of those who supported the league moved to a reservation on Grand River, Ontario, where their descendants now live. About 400 live on the Onondaga Reservation in New York.

Osage, a tribe of Siouan stock, now living on a reservation in Northeastern Oklahoma. These Indians have the distinction of being the richest tribe, per capita, of any in the United States, for they secured good terms in selling to the government their holdings between the Missouri and the Arkansas rivers, and added to their wealth through the collection of royalties on oil wells now being operated on their reservation. Over \$30,000,000 in leases and royalties accrue to them from their oil lands every year. Their prosperity has tended to weaken some of them morally. The Osage Indians were generally friendly to the French throughout the colonial period, and were frequently at war with the neighboring Cherokee, Chickasaw, Creek, Choctaw, and other tribes. They are fast diminishing in number, only about 2,500 surviving, as contrasted with the 6,000 living in the early part of the nineteenth century.

Ottawa, a tribe belonging to the Algonquian family. From their homes along the Ottawa River, in Canada, they were driven out by the Iroquois in the middle of the seventeenth century, and were forced to settle on Manitoulin Island, in Lake Huron. After 1660 they scattered over the region now comprising lower Michigan and neighboring sections of Ohio and Illinois. Pontiac (which see) was their most famous chief. In the colonial wars, the Ottawas always fought with the French against the English, but they joined cause with the English against the Americans in the Revolution and in the War of 1812. At the present time, the Ottawas who live in the United States are found in scattered settlements in lower Michigan; the Canadian contingent is within the province of Ontario. Although originally these Indians were cruel, they were quick to adopt the arts of peace and industry, and learned eventually how to build comfortable huts, to till the soil, and to raise domestic animals.

Pawnee, *paw ne'*, a tribe belonging to the Caddoan stock. The name, which is a native word meaning *horn*, was given them because of the hornlike scalping lock which they wore, arranged in such a manner as to stand upright.

Their home formerly was along the banks of the Platte River in Nebraska. They raised grain and vegetables, and built permanent homes of logs and earth. During an epidemic of smallpox in 1838, over 2,000 members of the tribe died. In 1833 they ceded their territory south of the Platte River, and in 1858 gave up all their remaining land except a small strip along the Loup River, on which they remained until 1874. Then they removed to a reservation in Indian Territory (now Oklahoma), where they number not more than 600.

Pequot, *pe' kwot*, a quarrelsome tribe of the Algonquian family, which was almost wiped out in a war with the English settlers in 1637. The original home of the Pequots was in Eastern Connecticut, in the region of the Mystic River, on the banks of which they had built their principal fort. In an attack on this fort by a company of English under Captain John Mason, about 600 Indians perished; many were shot while attempting to escape, and others were captured and sold into slavery.

Pima, *pe' mah*, a tribe living in the Gila River and the Salt River reservations in Southern Arizona. Ruins of pueblos on the south bank of the Gila indicate that at one time they lived in adobe houses, which were never rebuilt after destructive wars with the Apaches and other invading tribes. They have since lived in dome-shaped huts made of logs covered with brush and earth. From earliest times, the Pima have irrigated their fields, running canals from the river and distributing the water by means of ditches and rude dams. They raise crops of wheat and corn and the most common vegetables, and use the beans of the native mesquite for food. The women of the tribe, who do all of the work except plowing and sowing, are very skilful in the making of water-tight baskets.

The Pima Indians are a peaceful tribe, and the wars they have fought have been wars of defense. They are exceedingly skilful with the bow and arrow, and have used them until very recently. The tribe numbers about 3,500.

Ponca, *pong' kah*, one of the tribes belonging to the Omaha division of the Sioux family, the

majority of whom are now living in Oklahoma and the remainder in Nebraska, on the Santee Reservation. Originally they lived with the Omahas near the Red River of the North, but after many treaties with the United States government, they settled at the mouth of the Niobrara River, near the Nebraska-Dakota boundary. There Lewis and Clark visited them in 1804, while on their expedition westward. Later, the United States ceded the lands of the peace-loving Poncas to the Sioux, and in 1877 the tribe was forcibly removed to the present Oklahoma, where large numbers of them died. The following year, they revolted and returned to

the Omahas. Their sufferings aroused public sympathy, and in 1880 the rebels were pardoned and given the rights of citizenship. Later, a part of the tribe was permitted to return to Nebraska. In all, the Poncas number fewer than 1,000.

Potawatomi, *pot a wol' o mih*, a tribe belonging to the Algonquian family. Their name, meaning *fire makers*, has reference to their

custom of making a tribal council fire. In the latter part of the seventeenth century, they were living near Green Bay, Wis., but later they settled in the southern part of Michigan and in Illinois, eventually taking possession of a large territory in the vicinity of Lake Michigan, which included lands in Wisconsin, Michigan, Illinois, and Indiana. In this region they had about fifty villages. The Potawatomi took part in the conspiracy of Pontiac (which see), and fought with the English in the Revolution and in the War of 1812. As civilization moved westward, they were gradually driven beyond the Mississippi, and now are rather widely scattered. They number about 2,500, of whom nearly 900 are citizens of Oklahoma. Other groups are found in Kansas, Michigan, Wisconsin, and Indiana. In Ontario there are about 150 of mixed Potawatomi and Ojibwa blood.

Quapaw, *kwah' paw*, from the Indian word *Ugakpa*, meaning *downstream people*, is the name of a tribe of the Siouan family, forming one of the two divisions of the Dhegiha group, the other being the Omaha. They were also known as the Arkansas Indians. When the tribes separated the Quapaws supposedly went



Photo: Visual Education Service

INDIAN PONY TRAVOIS

This was the primitive vehicle of the American red men. Two trailing poles served as shafts, and between them the burden, or load, was borne.

down the Mississippi River, and the Omaha group up the Missouri. The earliest known history of these Indians begins with the chronicles of De Soto's expedition in 1539-1543. The remnant of the tribe, numbering about 300, live on a reservation in Oklahoma.

Sac, sak, or Sauk, sawk, a warlike tribe of the Algonquian family, who were persistently hostile to early white settlers. Black Hawk (which see), their greatest chief, was one of the most famous Indians of American history. French explorers found the tribe in Northern Wisconsin, in the latter part of the seventeenth century. The Sacs and their kinsmen, the Foxes, who also lived in that region, were driven southward by the Ojibwas, and ultimately the two kindred tribes formed a confederacy. These Indians were gradually forced west of the Mississippi River, and the few remaining now live in Kansas and Oklahoma.

Seminole, sem' ih nohl, a tribe of Indians belonging to the Muskogean family, famous for the stubbornness with which they resisted attempts of the American government to force them out of their Florida home. Their troubles with the United States began in 1817, when General Andrew Jackson invaded their territory, then a Spanish possession. Two years later, Florida was purchased by the United States. In 1832 a treaty was concluded whereby the Seminoles agreed to remove beyond the Mississippi, but several thousand of the tribe under the leadership of Osceola (which see) disregarded the treaty and began war against the United States. A terrible conflict followed, lasting seven years (1835-1842) and costing the government \$10,000,000 and thousands of lives. Eventually, the Indians were conquered. The majority removed to Oklahoma, where their descendants number about 1,500. A few hundred have been living in the Everglades of Florida (see EVERGLADES), where the government placed them on a small reservation because of the drainage operations in the swamps.

Seneca, sen' e kah, a tribe of Iroquoian stock, which ultimately became the most important element in the confederacy known as the Five Nations (see above). When the white men first came in contact with them, the Senecas were settled in Western New York between Seneca Lake and the Genesee River. They fought fiercely against the Neutral Nation and the Erie, and absorbed the remnants of these tribes after conquering them (about 1650). They then spread out along the country west of Lake Erie and south along the Allegheny River to Pennsylvania. During the Revolu-

tionary War, the Senecas supported the English. About 2,500 live on reservations in New York, and about 200 are in Ontario on the Grand River Reservation.

Shawnee, shaw ne', a tribe belonging to the Algonquian family. They were first known to white men about 1670, when they were living along the Savannah River in South Carolina. Later, they spread out into Tennessee, Kentucky, Pennsylvania, and Ohio. They were a strong, warlike people, superior in intellect, and very courageous. Tecumseh, their most celebrated chief, fiercely opposed the advance of white settlers upon Indian soil and harassed them continually. In 1812 he led the Shawnees against the Americans, but his death dispirited his people, and their later history is a record of treaties and movements westward. The remnant of the tribe, numbering about 1,400 persons, live in Oklahoma.

Shoshoni, sho sho' ne, or Snake, a division of the Shoshonean family, who inhabited the mountainous region of Wyoming and Montana, Central and Southern Idaho, Northeastern Nevada, Eastern Oregon, and a small part of Utah west of Great Salt Lake. They were frequently called Snake Indians by those who thought that their tribal sign—a waving motion of the first finger—stood for snake. The Eastern bands were called *Horse*, or *Buffalo*, Indians, because they kept horses and sometimes hunted the buffalo. Those farther west were a degraded type, said to be among the lowest order of men. As the barren country was devoid of large game, these Indians depended for food, to a large extent, on fish, small animals,

roots, and seeds. These Western bands were often called *Diggers*, and sometimes *Walkers*, because they were too poor to own horses. The Eastern tribes lived in tepees, but those in the sagebrush country used brush shelters. The Shoshoni now live on reservations in Idaho, Nevada, and Wyoming, and in all number about 3,000.

Sioux, soo, or Dakota, a large, powerful tribe of North American Indians of the Siouan family, who formerly occupied the region extending from the Arkansas River in the south to the western tributary of Lake Winnipeg in the north, and west nearly to the Rocky Mountains. In the War of 1812, they aided the British. In 1837 they ceded all their lands east of the Mississippi to the United States, and in 1851 they ceded 35,000,000 acres west of the Mississippi for \$3,000,000. The government failed to carry out the provisions of the treaties, and this caused a general uprising of the Sioux in 1862; nearly 1,000 settlers were

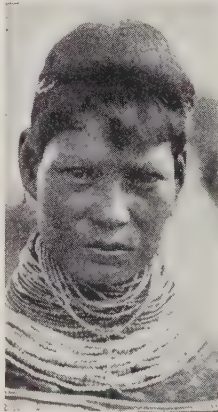


Photo: P & A

A SEMINOLE BELLE



Photo: Wide World

"THE LEGISLATURE OF THE EVERGLADES"

The council of the Seminole Indians in executive session. The man who is second from the right was said to be 105 years old when the photograph was taken; his small grandson stands at his side.

killed before the Indians were finally subdued. All of the Minnesota Sioux were then removed to Dakota reservations.

Some of the bands settled in the Black Hills, and when gold was found there, the United States tried to purchase the tract. Sitting Bull, Spotted Tail, and Red Cloud visited Washington in 1875, but President Grant was unable to persuade them to sign a treaty. In June, 1876, an exploring expedition under military guard was attacked on the Little Big Horn; a severe battle followed in which General Custer and all of his immediate command were killed (see CUSTER, GEORGE A.). After several encounters, the Indians were beaten, and later were pardoned and returned to their Dakota reservation. Another outbreak in 1890 was quelled by General Miles.

The Sioux represent the highest type of North American Indians in physical courage and intelligence. Several books and papers printed in their language have been published. They are now settled on various Western reservations, and number about 22,000. These Indians showed their loyalty in 1917 by enlisting in great numbers in the volunteer army. Their chief, too old to fight, was made a vice-president of the Red Cross Society.

Snake. See *Shoshoni*, above.

Tuscarora, *tus ka ro' rah*, the name of a tribe belonging to the Iroquois Confederacy.

They were separated from their kindred at an early date, and were living in North Carolina when the Europeans came to America. At the beginning of the eighteenth century, the Tuscaroras were divided into seven clans, occupying fifteen villages and numbering 1,200 warriors, a total membership of about 6,000. In 1711 they attempted to annihilate the white settlers in North Carolina. In a fierce battle fought near the Neuse River, on January 28, 1712, about 400 Indians were killed or wounded. The following year another uprising occurred, and Colonel Moore of South Carolina captured 800 of them. The remaining Tuscaroras fled northward and joined the Iroquois Confederacy, being received as the Sixth Nation of that league (see *Five Nations*, above). The remnant of the tribe, about 750 in number, are to-day living in Canada and New York.

Ute, a branch of the Shoshonean family which at one time occupied the central and western parts of Colorado, the northeastern section of Utah, and a portion of New Mexico. In 1879 government agents endeavored to persuade the Utes to turn their attention to agriculture; they were supplied with the necessary implements, as it was realized that the vast regions used by the Indians for hunting could not be permanently left open to them. A spirit of mutiny arose, and the local Indian agent wrote

to the Bureau of Indian Affairs for assistance. Three detachments of troops were sent against them before they were subdued.

The Utes sold most of their lands to the government, and went on a large reservation in Southwestern Colorado, but later were permitted to live in Utah. They number about 1,500.

Wampanoag, *wom pah no' ag*, a powerful family, of the Algonquian stock, whose former home was Southern Massachusetts from Cape Cod to Narragansett Bay. At one time the tribe numbered 30,000, but the number was reduced to less than 1,000 by a terrible epidemic before the Pilgrims landed (1620). The sachem of the Wampanoags was the famous Massasoit. While he lived, the tribe was friendly to the English, but a growing dissatisfaction ripened into war in 1675, under the leadership of Massasoit's son, King Philip, which resulted in the annihilation of the tribe. King Philip's son was sent with others to the West Indies and sold into slavery. In these volumes, see MASSASOIT; KING PHILIP.

Winnebago, *wine ba' go*, a tribe of Siouan Indians, part of whom live on a reservation in Northeastern Nebraska. The others are found among the whites in the vicinity of Lake Winnebago, in Wisconsin, where in former days the tribe had one of its strongholds. All told, the Winnebago Indians are fewer than 2,000 in number. Originally, these Indians depended for food upon wild rice and what they obtained by hunting and fishing. They also practiced farming on a small scale, and knew how to obtain sugar from the maple. The women were skilled in dyeing and weaving. These Indians call themselves *Hochauka*;

Winnebago is an Algonquian name, applied to them by white men.

Wyandotte. See *Huron*, above.

Yakima, meaning *runaway*, the name of an important tribe that formerly lived on both sides of the Columbia and on the northerly branches of the Yakima and the Wenatchee rivers, in Washington. A treaty was made with the Yakimas by the United States government in 1855, by which the Yakima Reservation in

Eastern Washington was established. Thirteen tribes, besides the Yakimas, were to be confederated as the Yakima Nation upon the reservation, but before the treaty could be ratified, an Indian war broke out which involved them. It was not until 1859 that the provisions of the treaty were carried into effect.

It is now impossible to estimate the number of Yakimas proper, as the term has been used to include all the tribes within the limits of the reservation. Of the total population living on the reservation, about 1,500, very few are true Yakimas. Originally, the Yakimas were active fishers, hunters, and traders.

Yaqui, *yah' ke*, a tribe of Piman

stock, representing a well-advanced stage of civilization. They lived in villages in the Mexican state of Sonora, but the government gradually removed many of them to Tehuantepec and Yucatan. The Yaquis are an energetic and courageous people. The men in their communities cultivate corn, tobacco, beans, and cotton, and the women are skilled weavers; also, in the country about their settlement, these Indians are employed in mining, stock-raising, and other industries, and are good workmen when willing to labor. They number about 13,000.



Photo. U & I

AN EXCEPTIONALLY FINE CHARACTER STUDY

Chief Spotted Tail, in full Sioux Indian dress, as he appeared in Washington, D. C., with others of his race, for a conference with President Coolidge.

Yuma, yoo' mah, a tribe belonging to the same family as the Mohave. When the early explorers entered their territory, on the Colorado River, below the mouth of the Gila, the Yuma was a large and progressive tribe. Its members were unusually fine-looking and brave, but not inclined to be continually on the warpath, and they derived most of their living from their fields of corn and beans, pumpkins, and melons. To-day, there are about 600 on the reservation of Fort Yuma, in Southwestern California.

Zuñi, zoo' nye, the popular name of the oldest and most important tribe of Pueblo Indians. They live in a single permanent pueblo, or village, situated in New Mexico, and known as Zuñi. In summer the tribe also occupies the three neighboring villages of Pescado, Nutria, and Ojo Caliente. The Zuñi Indians have lived in the same narrow valley for many centuries; the Spanish invaders found them there when they came in 1539, and the Zuñis have not left the place since. They are a self-supporting people, cultivating the ground and raising small herds of cattle, sheep, and donkeys. They number about 1,600. The houses are entered from the roof, and the interior is reached by climbing up one ladder and down another. When a Zuñi wishes to lock up his dwelling, he simply pulls up his ladder.

E.S.C.

Related Subjects. For information as to the various tribes outside of the United States and Canada, and the leading individual Indians, the reader is referred to the following articles in these volumes:

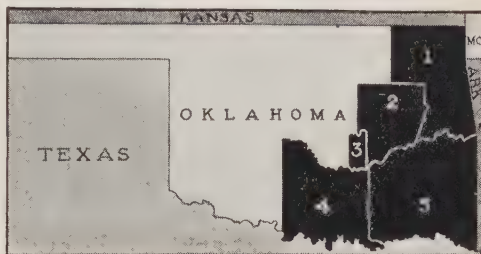
TRIBES OR FAMILIES		
Aztec	Inca	Maya
FAMOUS INDIANS		
Atabualpa	Osceola	
Black Hawk	Pocahontas	
Brant, Joseph	Pontiac	
Geronimo	Powhatan	
King Philip	Sitting Bull	
Massasoit	Tecumseh	
	Uncas	
GENERAL TOPICS		
Calumet	Totem	
Sun Dance	Wampum	

INDIAN SUMMER, the name usually applied to a short season of fair, warm weather occurring in the late fall in temperate latitudes. In the United States and Canada, the weather may change during October or November; in place of autumnal cold, the genial influences of warm, hazy, summery days are felt for a time. The same phenomenon is experienced in Europe, the seasons there being formerly called "Saint Martin's summer," "Old Woman's summer," or "All Hallow summer." The term *Indian summer*, however, has come into almost universal use. At the time of the Indian summer, the air is usually dry, and the remaining leaves of trees and plants quickly shrivel and fall off

The origin of the term is uncertain. Many theories have been advanced, but none with any degree of authority. That the Indians predicted such a season to the first Europeans landing in America, who gave it the name, is possible, but highly improbable, as the term first appeared in books and manuscripts as late as 1794.

R.H.W.

INDIAN TERRITORY, formerly a territory of the United States, which was set apart by Congress as a residence for the Indian tribes



INDIAN TERRITORY

The former Territory, now a part of Oklahoma.

The homes of the nations were as follows:

- | | |
|---------------|----------------|
| (1) Cherokee. | (4) Chickasaw. |
| (2) Creek. | (5) Choctaw. |
| (3) Seminole. | |

who had been forced out of Georgia, Florida, and other Southern states. Between 1820 and 1840, the Cherokees, Creeks, Chickasaws, Choctaws, and Seminoles gave up their eastern lands and accepted their new homes on condition that they be allowed to maintain their tribal governments. These five tribes, later known as the Five Civilized Tribes, or Nations, established governments like those of the states, each with a governor and a legislature; they made and enforced their own laws, maintained their own school systems, and generally conducted themselves as independent nations. Besides the Five Civilized Tribes, reservations were set aside at various times for the Modocs, Ottawas, Peorias, Senecas, Osages, Kiowas, Comanches, the Apaches, and other tribes. Unfortunately, the Indians were too few to hold all the land thus given them, and white settlers, or "squatters," encroached upon them, especially in the western part of the territory. In fact, after the War of Secession, many white men mingled with the Indians, married Indian women, and became influential in the government of the tribes.

It was finally apparent that settlers could no longer be kept out of the Territory. In 1889, therefore, the United States purchased from the Indians the western part of the old Indian Territory, and in the next year organized it as Oklahoma Territory. The opening of Oklahoma Territory to settlement was followed by an influx of white settlers in what remained of the Indian Territory. By 1900 the whites outnumbered the Indians six to one,

and the tribal government became totally inadequate under these conditions. In spite of the original guaranty of tribal independence, the Indians were forced to yield to an act of Congress of 1897, which gave the United States courts jurisdiction within the Territory. In 1898 the Curtis Act, which was designed to transfer property rights from the tribes to the national government, provided for the enrollment of the Indians as citizens and for the regulation of town sites, and it gave the President a veto over acts of the tribal governments. By agreement with the Five Tribes, the allotment of land to individuals was begun, and on March 4, 1906, all tribal government ended. Congress then passed an enabling act by which Oklahoma and Indian Territory together could become a state. The state of Oklahoma was admitted to the Union on November 16, 1907, and the Indian Territory ceased to exist.

Related Subjects. See INDIANS, AMERICAN, for the history of the red man in the United States and Canada.

INDIAN TOBACCO. See LOBELIA.

INDIAN TURNIP. See JACK-IN-THE-PULPIT.

INDIA PAPER. See BOOKS AND BOOK-BINDING (Modern Book-Making).

INDIA RUBBER. See RUBBER AND RUBBER MANUFACTURE.

INDICATIVE MODE. See MODE, subhead.

INDICOLITE, *in dik' o lite*. See TOURMALINE.

INDICTMENT, *in dile' ment*, in criminal law, is a written accusation against one or more persons, presented upon oath by a grand jury. The term is derived from the old French word *inditer*, meaning *to indicate*, or *point out*. The object is to indicate the offense with which the accused is charged. The essentials of a valid indictment are that it be presented in the proper district, to some court having jurisdiction over the offense charged; that it be a "true bill," signed by the foreman of the grand jury and by the prosecuting attorney; that it contain a clear description of the crime and the name of the accused; and that it be written in the English language. The form and language of an indictment are prescribed by law. One cannot be convicted of a greater offense, at the time of trial, than that charged in the indictment which is the basis for trial. See JURY AND TRIAL BY JURY; COURTS (Court Procedure).

INDIES, *in' diz*. See EAST INDIES; WEST INDIES.

INDIGESTION. See DIGESTION; DYSPEPSIA.

INDIGO, a deep-blue dye used so commonly in calico-printing, in coloring silks and woolens, and in imparting a slight tint to delicate white fabrics, that the expression "blue as indigo" has passed into a proverb. Formerly the dye

was produced in large quantities from plants of the pulse family; by far the largest part came from the East and West Indies, and especially from Bengal. Indeed, the very name is but a form of the word *India*. Centuries ago, the European traders brought back with them from India this blue dye, and to this day the same simple methods of manufacture which prevailed then are in use in that far-away country.

The straggling plants, which reach a height of about six feet, are cut just before their blossoms appear, and are steeped in water in great airless vats for twelve or fifteen hours.



INDIGO

Branch, flower, and beans.

The liquid that results is almost colorless, and is known as *indigo white*, but on being stirred violently in an open tank, it produces the foamy *indigo blue*, which rises to the top as a scum. Later, this sinks to the bottom, and the clear water is easily

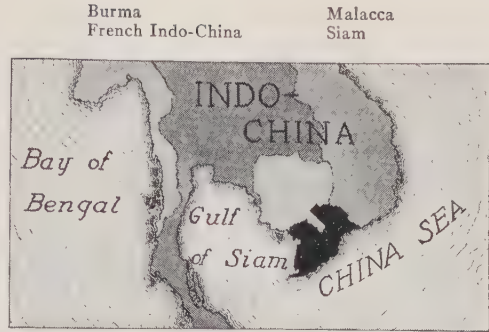
drawn off. The indigo blue is then collected from the bottom of the tank and dried, and is ready to be sent to market.

When indigo blue is used for dyeing, it is converted again into indigo white, and in this form is applied to the fabrics. These are then exposed to the air, and the oxygen has the same effect which it had in the earlier process, and turns the white to blue. In printing calicoes with indigo blue, the cloth is first dyed a plain blue, and the white pattern is produced by bleaching. About 1740 indigo began to be produced in considerable quantities in Georgia and North Carolina, but the industry did not survive the War of Secession. Indigo is sometimes used as bluing.

Coal-Tar Indigo. Since 1897 much indigo blue has been produced from coal tar, and the discovery of this process is regarded as one of the greatest victories of industrial chemistry. To German chemists are we indebted for the successful synthesis and manufacture of this valuable dyestuff. Fifteen years after artificial indigo first appeared on the market, it had practically driven out the natural dyestuff, even in countries where the indigo plant is produced. Natural indigos contain only twenty to ninety per cent of the coloring matter, and this is not all indigotin. Artificial indigo is practically pure indigotin, and is therefore more uniform in quality than the natural dye. See DYEING AND DYE-STUFFS.

T.B.J.

INDIGO BIRD, OR INDIGO BUNTING, a North American bird of the finch family. It ranges from Ontario, Quebec, and New Brunswick as far south as the Gulf states, and winters from Southern Mexico to Panama. Three or four pale, bluish-white eggs are laid in a nest of grasses, leaves, and bark. The male is a bright indigo-blue, clear on the head and greenish on the back; the female is a warm brown with obscure streaks on the back. The indigo bird trusts mankind and is easily tamed. It is a tireless songster, and continues its warblings long into the summer after most birds have



LOCATION MAP

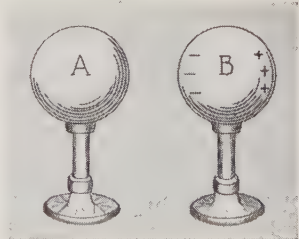
INDO-EUROPEAN LANGUAGES. See LANGUAGE; LANGUAGES OF THE WORLD.

INDO-EUROPEAN RACES. See ARYAN.

INDOOR BASEBALL. See BASEBALL, subhead.

INDUCTION, ELECTRIC. Electrostatic induction is the process by which a conducting body becomes electrified when placed in the neighborhood of, but not in contact with, another body already charged. We also speak of an induced current, referring (1) to a current produced in a conductor by the relative motion between that conductor and a magnet (*electromagnetic induction*); and (2) a current produced in a conductor by the nearness of another current whose direction or intensity is constantly changing (*mutual induction*).

Electrostatic induction may be illustrated by the following experiment with two metal balls, which we shall call *A* and *B*; these are mounted on insulated supports (see illustration). Suppose that *A* is charged positively and *B* is uncharged. Let *B* be brought near enough to *A* to be influenced by the electric field about it, but not close enough to be charged by conduction of electricity from *A*. Then if *B* is tested with an electroscope, it will be found charged negatively on the side nearest *A*, and charged positively on the opposite side. If the finger should touch *B*, making a connection with the ground by means of the body, and if *B*, when insulated again (the finger withdrawn), should be separated from *A*, *B* would be found charged throughout with negative electricity; that is, with electricity opposite in sign from that of the attracting body.



The principle of induction is readily understood when explained by the electron theory.



Photo: Visual Education Service

INDIGO BIRD AND NEST

ceased to sing. It also sings freely during the hot hours of the day, when most other birds are silent. Indigo birds feed largely on insects and weed seeds, and are beneficial. See BUNTING.

D.L.

Scientific Name. The indigo bird belongs to the family *Fringillidae*. It is classed as *Passerina cyanea*.

INDIGOTIN, in' dih go tin. See INDIGO.

INDIUM, in' dih um. See CHEMISTRY (The Elements).

INDO-CHI'NA, the name given to the provinces in the southeastern peninsula of Asia, extending northwest to southeast between the Bay of Bengal and the China Sea. The region is sometimes called *Farther India*, and embraces Burma, Siam, and French Indo-China, the latter comprising the provinces of Anam (or Annam), Cochin-China, Tongking, Cambodia, and Laos.

Related Subjects. For detailed treatment of the various parts of this region, the reader is referred to the following articles in these volumes:

Negative electricity exists in the form of minute grains of matter called electrons; the unit of positive electricity is the proton. Electrons alone are free to move. An uncharged atom has an equal number of electrons and protons; an excess of electrons gives a body a negative charge, and a deficiency of electrons gives it a positive charge. In the experiment, the positive charge on *A* pulled some of the electrons in *B* toward it, since unlike charges of electricity attract each other, and electrons are free to move. Thus the side near *A* received an excess of electrons and became negatively charged, while the farther side, having lost electrons, became positively charged. There was no conductance of electrons away from *B*; it retained equal amounts of negative and positive electricity, but differently distributed.

When *B* was connected with the ground through the body, enough electrons came from the earth to neutralize the excess of protons in the farther side, but the electrons in the nearer side were held bound by the positive charge on *A*. When *B* was insulated again by removal of the finger, and the balls were separated, *B* was left with an excess of electrons and so became negatively charged throughout. In lightning we have an example of electrostatic induction on a large scale. H.S.E.

Related Subjects. For a practical application of the induction of currents, see INDUCTION COIL; DYNAMO; TRANSFORMER. See, also, ELECTRICITY; ELECTROSCOPE; LIGHTNING.

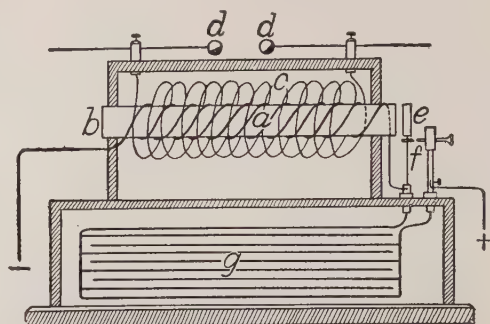
INDUCTION, ELECTROMAGNETIC. See ELECTROMAGNETISM.

INDUCTION, MAGNETIC. See MAGNET AND MAGNETISM.

INDUCTION COIL, a device for increasing the strength of an electric current. It is based on the principle that current may be induced in a metal conductor by the disturbance of the magnetic field about another conductor through which electricity has been sent. The accompanying illustration shows the essential parts of an induction coil. The inner coil of wire marked *a*, which is wound around a soft iron core, *b*, is called the *primary coil*. The outer coil *c*, made of fine wire insulated from the primary, is called the *secondary*. A vibrating apparatus, *e f*, called the *interrupter*, serves to make and break the current that is sent through the primary coil from a battery. The part marked *g* is a condenser, the purpose of which is to provide a place into which the current may flow when the circuit is broken.

When the points *e f* are brought in contact, a current enters, flows through the inner coil, and back to the battery. The spring that holds these points together has a piece of soft iron on its upper end directly opposite the end of the core *b*. When the circuit from the battery is closed, this core becomes an

electromagnet and draws the iron toward it, opening the circuit at *e*. The core then loses its magnetism and the spring pulls the piece



INDUCTION COIL

The figure is explained in the text.

of iron back, forming the connection with the battery again, closing the circuit, and starting the whole process over again. The circuit is opened and closed with great rapidity.

The wire in the secondary coil is very long, and the rapid opening and closing of the circuit in the primary coil induces in the secondary a much higher voltage than that which is applied to the primary. In one of the largest induction coils ever made, the secondary coil was 280 miles in length and was wrapped about the primary coil in 340,000 turns. When operated with a battery of thirty cells, it caused a spark forty-two inches long to leap between the opposite ends of the coil. The strength of the coil is measured by the distance between the points *d d*, across which a spark will pass.

Small induction coils are used in medical work, and larger ones in telephone and wireless apparatus, and for producing X-rays. The "spark coil" of an automobile which furnishes the current necessary to produce the spark that explodes the gas is an induction coil. See ELECTROMAGNETISM; TRANSFORMER. H.S.E.

INDUCTIVE, in duk' tiv, METHOD, that method of instruction which proceeds from individual ideas, gained through observation, to the formation of definitions, classifications, and rules. It is also called the method of observation and the method of discovery. At first, children gain their knowledge by observation and experience; hence all children learn inductively. By comparison of ideas, they gradually form general notions. The child first gains an idea of his own dog, for instance; then, by observation of other dogs, he forms the idea *dog*. This idea does not mean merely his dog, but any dog; that is, it is a class, or general, idea. In a similar manner, children learn the principles of number and many of the definitions in geography. The inductive method is

especially adapted to instruction in the primary grades; it is also the method employed in scientific discovery, and it is valuable in beginning the study of most new subjects.

The inductive method, however, should not be carried too far. The child should be led to apply his knowledge as fast as he gains it; to proceed by the inductive method in gaining every new idea would be a waste of time. In the study of algebra, geometry, or grammar, for instance, much more can be accomplished in a given time by beginning with definitions and rules than by observation and experiment; hence all right methods of teaching begin with the inductive method with young children, and gradually lead to the deductive method (which see).

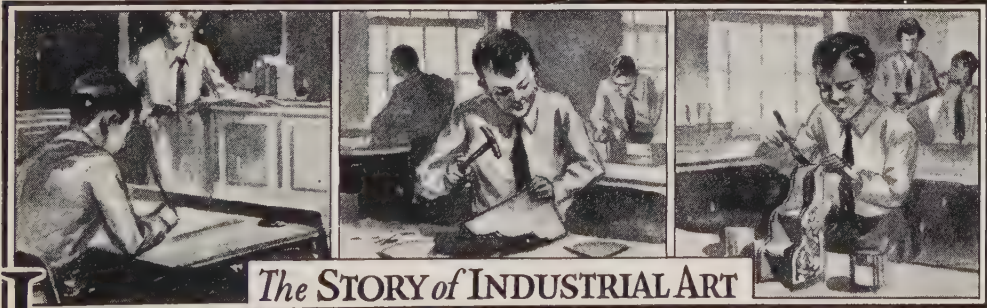
INDULGENCE, *in dul' jens*, in the Roman Catholic Church, a remission of temporal punishment due to actual sins, the guilt of which is already forgiven. In the earlier ages, the punishment imposed by man for sin was more severe than at the present time; now, definite forms of prayer are the most common means of obtaining indulgences. As in the early Church, so now, people still pray, fast, give alms, and occasionally make pilgrimages, to obtain the benefits of indulgences. Indulgences are of two kinds: *plenary*, which is a full remission, and *partial*, which, as the name implies, only partly remits the temporal punishment due to sin. Abuses in the manner of granting indulgences constituted one cause of the Protestant Reformation. See REFORMATION, THE. G.W.M.

INDURITE. See SMOKELESS POWDER.

INDUS RIVER, one of the three great streams of Northern India, rises in an unexplored region in Tibet, north of the Himalaya Mountains, at an elevation of 18,000 feet. Its drainage basin is estimated at 372,700 square miles, over twice the area of Ohio, Indiana, Wisconsin, and Illinois, and its total length at a little over 1,800 miles. The Indus, the "King River" of Vedic poetry, abounds with fish and is infested by crocodiles. The delta, which extends along the Arabian Sea for 125 miles, is not very fertile, and is almost treeless. The cultivation of the arid plains through which the lower Indus passes is dependent upon the annual overflow of the river, and artificial irrigation fed by that overflow. Thus the river is of greater importance for irrigation than for transportation. Its value as a navigable route for traffic has been greatly lessened since the construction, in 1878, of the Indus Valley Railway along its course, and its navigation is now confined chiefly to native craft. The tributaries of the Indus are each navigable for inland craft to the mountains.

In 1926 an irrigation project was begun, consisting of a barrage across the Indus just below Sukkur, where the river passes through a deep gorge. Seven canals now run southward and extend facilities for cultivation to an area of 5,500,000 acres. This is one of India's largest irrigation projects.

INDUSTRIAL ARBITRATION. See ARBITRATION, subhead.



INDUSTRIAL ART. For many years, people have thought that *art* meant only the drawing and painting of pictures, or the modeling of statuary and other beautiful forms. But now we are learning that art, instead of being limited to pictures and sculpture, has a great deal to do with everything that is made by man. We are hearing about artistic homes, artistic clothes, artistic bridges, artistic public buildings, and artistic factories and railroad stations. In buying certain fabrics or cloths to be made up into gowns, or to be used as curtains or hangings in a house, we find that those materials which are styled *artistic* command a

higher price, and certain nations in the world control the markets for dress goods, carpets, rugs, china and glassware, metal ware, watches, jewelry, and a host of other things, because their manufactured products are more artistic. We have come to speak of the kind of art that is expressed in things other than in pictures and statuary as *industrial art*, because it is art expressed through the medium of industry and manufacture.

Everybody should know a good deal about industrial art, for this is a great industrial continent, and it is of the highest importance that the things which are made here shall be

as worthy and as beautiful as the things which are made across the ocean. Not everyone is born with the genius to paint great pictures, or with the talent to draw cleverly, but everyone can learn the kind of art that is expressed in useful things, and this has to do with our selections of dress and of house furnishings, and our good taste in general. So what we once studied under the topic of *drawing* is now modified and changed in our schools to meet the demands of industrial art.

We find that it is still necessary for us to know much about form and color. We must still learn to draw objects, and to understand the laws of perspective. But in addition to this, we must go deeper into the study of *design*, which is the foundation of industrial art, and is governed by principles which can be learned as easily as the principles of grammar. Indeed, design is something like grammar. You know that there are rules which govern the use of English, and everyone who pretends to be educated at all should know why it is not correct to say "He has went" or "Between you and I." People often use good English without knowing much about grammar, but acquaintance with the rules of correct speech never injures the naturally good habit of talking and writing, and frequently we need to know *why* a certain expression is incorrect. It is so with the rules of design. Some people are born with a fine sense of color or proportion, or a general sense of order and fitness. We say that such people have good taste. But there are many people who need to have their tastes cultivated, and the study of design is the very best way to develop good taste in all matters that relate to the use of colors, forms, and shapes.

Design is arrangement. Arrangement of any kind is always the result of thought. In placing the furniture in a room, we must follow some plan. We cannot put the chairs and tables and bookcases and pictures around in a haphazard fashion. We must place each article where it will be convenient for use, and where it will look well. This thoughtful planning is design. We cannot permit every property-owner in a town to place his house or his sidewalk where pleasure suggests, without regard to his neighbor or to the appearance of the street. He must locate his house and his sidewalk in observance of the rules and restrictions which have been laid down in planning the street or the town. Our most beautiful cities are those which have been thoughtfully planned by good architects and landscape-designers, who think a project through from beginning to end, and who place every house or tree with regard to other buildings and other plantings that will be done at a later time.

The student of industrial art may specialize

in the design of manufactured articles, which includes almost anything from door knobs to automobiles; in costume design; in furniture design; in interior decorating; in handicraft design; in commercial art, a term applied to advertisement illustration, poster-designing, sign-painting, and lettering; in illustration of books and magazines; or in cartooning.

The problems that follow are planned to make clear the meaning of design in its relation to things of everyday use. In working out these problems, we shall employ the simplest of materials, and we shall help you to make a number of useful and beautiful articles, as proof that you are learning to understand the laws that govern design, and to use intelligently the beautiful harmonies of color.

Problem 1; The Making of a Booklet. Let us take for our first problem the designing, making, and decorating of a blank book, in which may be kept pressed leaves of trees, drawings, or pictures of birds or flowers, or even a collection of plant leaves.

The first thing to be selected is a suitable paper for the cover. It must be tough in quality, neutral (grayed or subdued) in tone, and unglazed. Gray manila paper, smooth, heavy wrapping paper, or colored construction paper may be the stock from which your choice is made. Fold a 9" x 12" sheet on its short diameter. You have, in this folded sheet, the simplest form of book cover. Select three or four sheets of 9" x 12" white or cream manila paper and fold each sheet separately on its short diameter. Place one sheet inside the other, in book form. Place the little book inside the folded cover. Adjust the pages to fit the cover, open the book at the middle, and place a dot on the crease at the center. Also place dots on the crease about one inch from each end. With a coarse needle and linen thread, sew through the middle dot from the inside to the outside, leaving a two-inch end of thread on the inside of the book. Sew back through the lower dot, out through the middle hole and back through the upper dot, bringing the thread to the middle hole and tying it to the end of the string in a knot, which remains on the inside of the book (Fig. 1).



For the decoration of the cover, let us take a leaf shape for the unit of design—that is, for the shape to be repeated to form, in this case, a border.

By using the device of paper cutting (Figs. 2 and 3), we instantly eliminate the confusing details that enter into the drawing or painting of a leaf. In design, we are interested only

in the shapes of things, and so we proceed to cut out, not one, but several leaf shapes, all exactly alike. We therefore fold a slip of paper 7" x 2" into a fourfold thickness, as shown in Fig. 4. Fig. 5 shows the process of free



Fig. 2 Fig. 3
Nature study through paper cutting

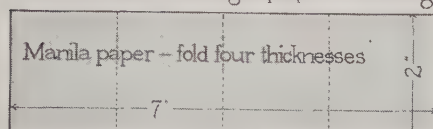


Fig. 4



Fig. 5
Free cutting of
leaf shape

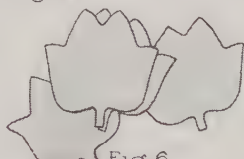


Fig. 6
Four design units
cut at once

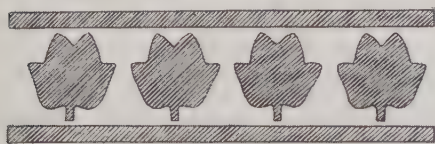


Fig. 7

cutting. Fig. 6 shows the four leaf shapes, exactly alike, which result from this cutting. Fig. 6 cannot be called a design, or an arrangement, because there is no order or plan observed in placing the leaves. In Fig. 7,

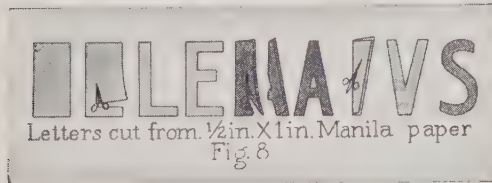


Fig. 8

however, we see that the mind has been at work, and order is established. The shapes have been thoughtfully spaced and arranged in a row between marginal bands. This arrangement we may call a border. Such a

border could be extended indefinitely, if we repeated more shapes, spaced like those in Fig. 7. When a repeated shape makes us feel a certain continuance of movement, we call it *rhythm*. Rhythm, or the apparent movement of related shapes, is one of the important principles of design.

When we repeat related shapes like the leaves in Fig. 7, we see another effect besides rhythm. Between every two leaves there is a space that is a part of the background. If you were to move the two leaf shapes farther apart, the shape of the background space would be wider. If you placed the two leaf shapes so that they touched, the background shapes would again be changed. In designing border rhythms, we should try to adjust the repeated shapes so that the background spaces will be beautiful in proportion and in shape.

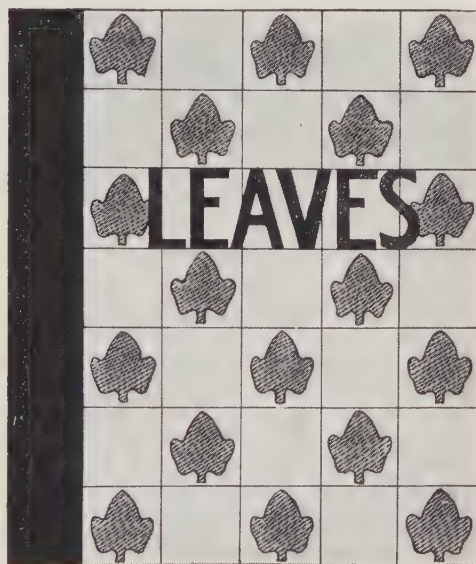


Fig. 9.

Sometimes we have to add other elements to background shapes in order to make them interesting. You will see how this is done in later problems.

From paper that is lighter or darker in tone than the cover of your book, cut four leaf shapes in the manner we have just described. Arrange them to form a border rhythm near the top of the front cover of your book. When background spaces and leaf shapes are well related, paste the leaf shapes in place. From the same paper, cut narrow strips to form marginal bands, and put them in place. The success of this exercise will depend upon the careful spacing of the units, on the width and placing of the bands, and on the neatness with which the work is done.

Another way in which you might decorate your book cover is shown in Fig. 9. Here the cover is ruled into inch squares. In every other square is placed the shape of a leaf. You could use the shape of a bird or a flower if you preferred. A paper pattern of the unit you wish to repeat could be cut from an inch square and used as a pattern in tracing. The shapes should be filled in with strokes of colored crayon, darker than the color of the cover. The third row of squares from the

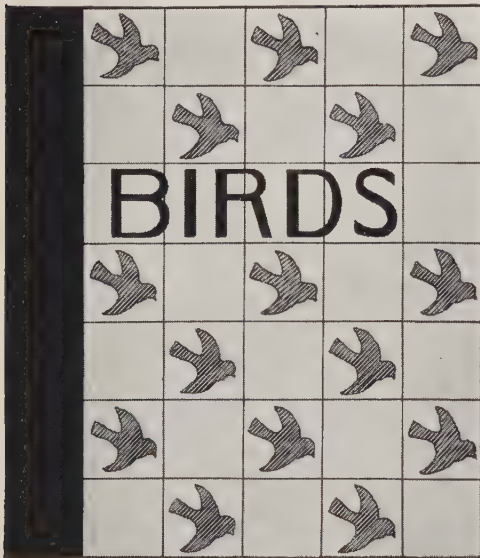


Fig. 10

top should be reserved for the title, such as "Birds," "Flowers," or "Leaves." The letters for the title should be cut from 1"x 1/2" manila paper, as shown in Fig. 8. The letters should be carefully spaced, and pasted in place. Figs. 9 and 10 are suggestions of booklets decorated in this way.

Problem 2; Stick Printed Designs. Most boys and girls like to print with rubber stamps. It is a quick way of signing one's name or of writing a word or phrase that has to be frequently used. There is a way of stamping small shapes in color which you will find most interesting, and you can work out many exercises in design by means of this little device.

A stick printing outfit containing a number of sticks of different shapes and some color pads can be bought from the school-supply houses for a small sum; but there are various home-made substitutes for stick printing which will give good results. Of course, you must have some kind of liquid color dye with which to print. Colored inks are good, and very strong bluing will do for blue; but the most

convenient way to get a variety of colors is to dissolve hard cakes of water color. With yellow, red, and blue water colors in strong solution, you will be able to print in a variety of colors. Black ink will do for printing black shapes.

To prepare your colors, provide yourself first with three two-ounce bottles. In one, put a cake of yellow water color, broken up into pieces small enough to be dropped through the neck of the bottle. In another bottle, put a cake of red, and in the third, a cake of blue. Add to each bottle a teaspoonful of mucilage. Fill the bottles with water, put the corks in, and let them stand until the cakes are entirely dissolved.

For printing sticks, there are many things which you can use. The ends of matches will print small round or square shapes; the ends of small corks will print larger circular shapes; and the clean-cut edges of thick cardboard will print lines or stems. At the hardware store you can buy dowels, which are round sticks, in quarter-inch and half-inch sizes. Short lengths (about an inch) will make excellent printing sticks. With a knife you can whittle or cut the ends of these sticks into different shapes, and this will give you a greater variety of units of design.

For printing pads, use small pieces of canton flannel, folded double. Place a pad in a small saucer and pour on it a few drops of any of your dissolved colors. When the pad has soaked up the color, press the end of a printing stick into the pad, and then stamp it on white or light-colored paper. The imprint should be clear and perfect. Practice printing these shapes with the other colors, and with the various sticks which you have collected.

To print green, pour a few drops of yellow and a drop or two of blue on the clean pad. The mixture will make green. To print orange, drop yellow and red on a clean pad. To print violet, drop red and blue on a clean pad. Experience will teach you how to add more or less of any color to produce the color you

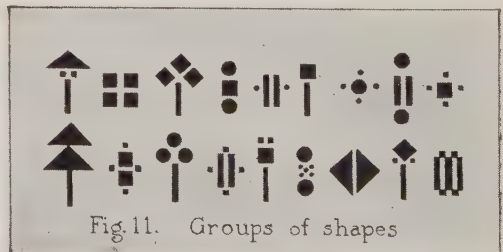


Fig. 11. Groups of shapes

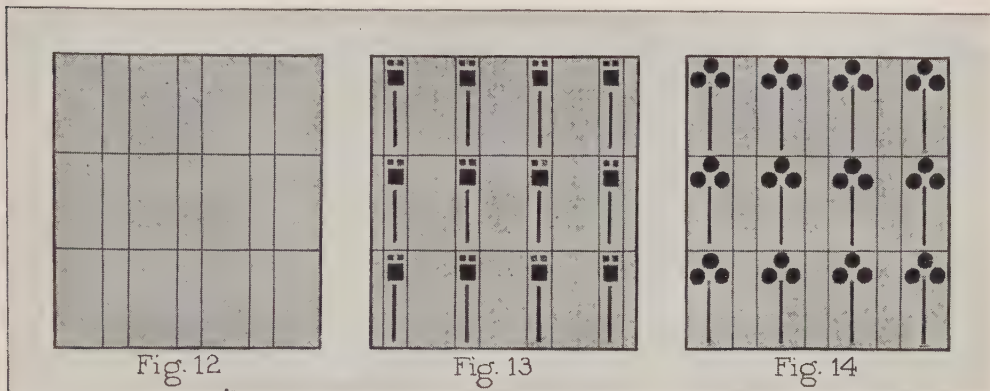
want (see the article COLOR). Fig. 11 shows many interesting shapes and groups of shapes that may be printed with this simple outfit.

When these units are carefully spaced in border rhythm, a number of interesting stripe

designs will result. In planning stripe designs, you will need to prepare a diagram by ruling your paper into equal spaces. Fig. 12 shows a piece of paper whose vertical edges have been ruled into equal spaces, and whose horizontal spaces have been ruled into spaces one-half and one-quarter as large. In the spaces thus made, groups of shapes have been printed, as shown in Figs. 13 and 14. In Fig. 13 the

cardboard by pins placed on each corner. Then print a border rhythm made of repeated units or groups of units in alternate stripes. Figs. 15 and 16 show two good designs. Fig. 15 may be a dark-blue, striped gingham, printed in blue and orange; Fig. 16, a green striped gingham, printed in red and black.

These printed fabrics may be made up into bags, as shown in Fig. 17. A twisted cord with

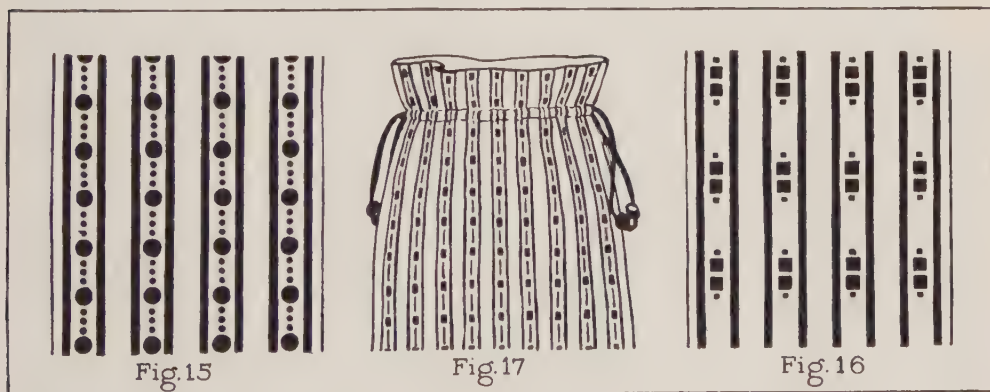


background might be of light-brown construction paper, and the shapes printed in red. In Fig. 14 the background might be light gray-green, and the shapes blue. With these pretty papers, you can make boxes, envelopes, book covers, or any other article that could be suitably made from decorated paper.

Probably you would most enjoy printing these shapes on cloth, for then your designs

several bright beads strung upon it gives a finishing touch. Such a bag may hold a duster, or it may be used for a work bag.

Problem 3; Transforming a Biscuit Box. When you print a number of stripes, side by side, on ruled paper or on cotton cloth, you establish another kind of movement which carries the interest in another direction. Not only does the eye move in the direction of a



would look like real patterns bought at the store. From your mother's piece-box, select scraps and remnants of striped ginghams, calicoes, or percales. Blue and white, brown and white, green and white, or black and white stripes will be excellent foundations for your designs. If the pieces are wrinkled, dampen them slightly and press them smooth with a hot iron. Fasten a piece to a board or stiff

border, but it travels over a surface, if it is attracted by interesting shapes and colors. Designs that are carried over a surface and that establish movement in two directions are called surface rhythms. They are used in wall papers, textiles, carpets and rugs, for inlaid floors and mosaics, and for any other purpose where a decorated surface is desired. In all such designs there should be the same rela-

tionships between repeated unit and background that we found necessary with border rhythms.

In planning surface rhythms, we again make use of a device that removes much of the difficulty of drawing and that saves much time. Squared black paper can be bought, or you can rule black construction paper into squares yourself, using a ruling pen and the

Black and white can be depended upon to balance spots of intense color. A little of the strong color solution that you used for stick printing may be added to a small quantity of letterine, making the opaque color that we use in design. In mixing, pour a half teaspoonful of letterine into a small saucer and add to it the same amount of the strong color you intend to use. Mix it well with the brush, and spread

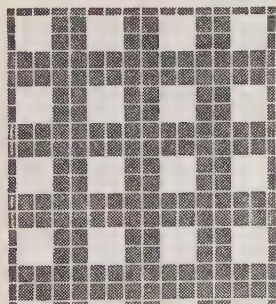


Fig. 18

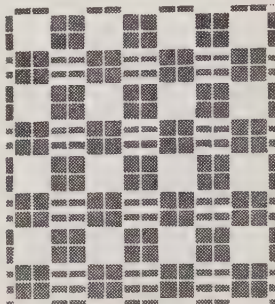


Fig. 19

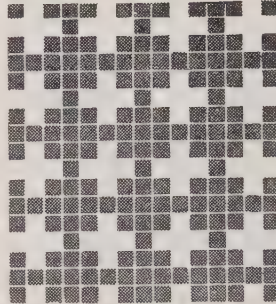


Fig. 20

white, opaque water color known as "letterine," or white show-card color. The squares should measure about a quarter-inch on a side. With the black squared paper as a background, with white letterine and a No. 6 water-color brush, you can make many interesting surface rhythms. Fig. 18 shows a beginning with a group of four squares filled in with white; and this unit has been repeated at regular intervals over the sheet. You can see that this makes a monotonous design. Our problem

the color evenly. You can paint light tones of opaque color on black or dark papers. This is not possible with transparent water colors.

Fig. 20 shows the beginning of a design that you will see has been used in a practical problem. A cross shape in bright-blue opaque color was painted at regular intervals over a sheet of black squared paper. In Fig. 21 a white open square has been painted in each background space. This gives snap and brilliancy to the design, and it is now worthy to

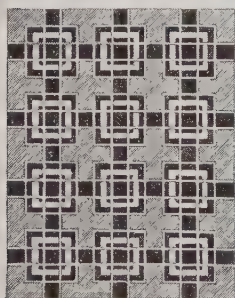


Fig. 21

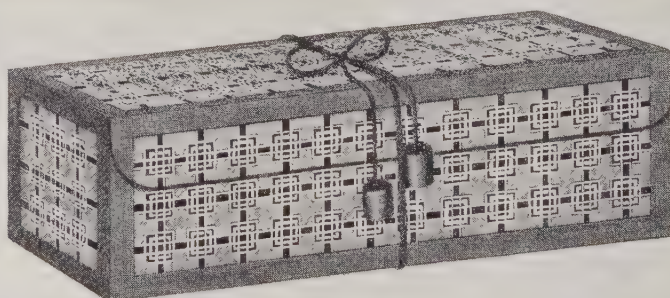


Fig. 22

is to make it interesting. The background shapes need to be modified. In Fig. 19 this has been accomplished by the substitution of three horizontal bands in alternate squares. The design now has quality, and is worthy to be put to some practical use.

Bright color effects may be used with surface rhythms if we are careful to select color harmonies [see COLOR (How to Use Color)].

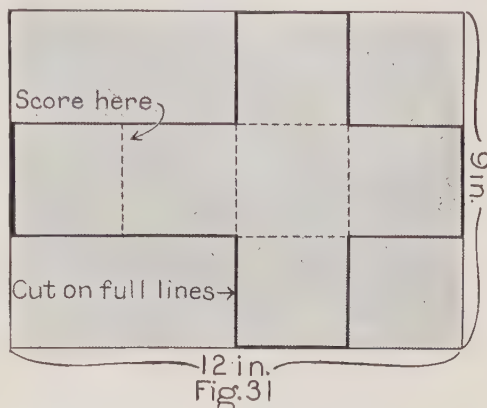
be used. Fig. 22 shows what this beautiful design did to an empty biscuit box. The wrappings and labels were all removed, disclosing a box of fine proportions and of a warm gray color. Panels of the decorated paper were cut for each side of the box, a half-inch less in each dimension than the side for which they were planned. Paste was spread over the entire surface of the wrong

side of these panels, and they were placed on the four sides of the box so as to leave a half-inch margin of gray all around the panels. The ends of the box were treated in the same way. A bright-blue cord of mercerized cotton was twisted for a tie string, and to the ends of this cord were fastened an orange and a blue bead. These beads were half an inch long, and were made of wood. They are the kind that children in the kindergarten use for stringing.

When the box was finished, one would never believe, unless he had seen it, that a thing so attractive could have been made from such commonplace materials. Of what use is such a box? It can hold collections of Christmas candies, assorted nuts, sugared pop corn, tiny cakes, or any of the numerous goodies that you can probably make yourself. But better than the mere fact that the box may be useful is the realization that you have had experience in decorating, and have learned that a knowledge and use of art can transform the humblest object into a thing of beauty.

Problem 4; A Decorated String Box. If you have watched the druggist and the grocer when they were weighing out the things they have to sell, you will know what scales are. They are instruments provided with weights placed at one end of a bar, which balance equal weights placed at the other end. Scales are sometimes called balances. You may not know that *balance* has anything to do with

In a design, if one part pulls your attention one way, then there must be an equal force that pulls your attention in the opposite direction. When all parts of a design pull equally, it is said to be *balanced*. By using again the device of paper-cutting, we can illustrate the simplest form of balance. Fold a small piece of paper in the middle. On the



folded half, draw a shape—any shape you like (Fig. 23). Be sure that the folded edge will be the middle of your design when the paper is unfolded. Cut out the shape you have drawn (Fig. 24) and open your paper (Fig. 25). You have now a balanced unit, one that is symmetrical, or exactly alike on both sides of its axis. Figs. 26 to 30 are other examples of symmetrical units that have been cut from folded paper. You will find the device of paper-cutting most helpful in working out these exercises in balance. Flower, leaf, and fruit forms, animal shapes, and shapes that have no particular meaning can all be made into symmetrical designs through the medium of paper-cutting.

The best way to learn about balance in design is to make something that will illustrate the principle. A box to hold a ball of twine is a useful article and will make a pretty gift. It can be decorated with balanced units painted with opaque water colors. On a piece of 9" x 12" gray cardboard, draw with a ruler the pattern shown in Fig. 31. Make each square in the pattern three inches on a side. Cut away the parts not included in the form of the cross, and score all the lines that represent edges to be folded. Fold on the scored lines, as shown in Fig. 32. Cut four pieces of dark-gray paper, each 3 inches by 1 inch. Fold these pieces on their long diameters. Paste each folded piece over a vertical corner of the box, as shown in Fig. 33. Cut other strips of dark-gray paper, each 3 inches by 1 inch, fold them as before, and bind all other edges of your box. Now cut from folded paper



Fig. 23



Fig. 24



Fig. 25



Fig. 26



Fig. 27



Fig. 28



Fig. 29

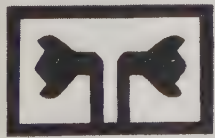


Fig. 30

design, but we shall learn that balance is as important an art principle as is rhythm. Colors and shapes are forces which act on our eyes much as weights act upon a pair of scales.

a balanced unit large enough to make a decoration for the sides of the box. In Fig. 34 two shapes from the morning-glory have been used, but you may choose any shapes that you prefer. Cut five $2\frac{1}{2}$ -inch squares of gray-green construction paper, fit your paper unit in each square, and trace around it. Prepare a circular unit for the top by cutting a circle and modifying it to suggest the top view of a flower. Trace this on the remaining square, and paste the squares on the sides and top of the box, slightly overlapping the edges of the gray margins. With opaque water colors, fill in the shapes. In Fig. 35 the lower part of the flower shapes on the sides may be painted white, and the upper parts light red. The circular shape on the cover is white, with a light-red band on the outside. Keep the color scheme the same on all sides.

When the colors are dry, you should outline all the shapes in India ink, using a small water-color brush to carry the line. In the center of the cover an eyelet hole is punched, through which the end of the string is passed. Small slits are cut in the cover and near the top of one side, through which narrow gray tapes for tying the cover down are slipped. The ends of the tapes are pasted to the under side.

Problem 5; A Butterfly Flower Stick. We find the principle of balance illustrated in many forms of nature. The human figure itself is an example of symmetry. We have two eyes, two ears, two legs, and two arms, balanced upon a central axis. Birds in flight are beautiful examples of perfect balance, for

the shape of a butterfly's wing. Cut out this shape (Fig. 36). From a berry box remove the strip that holds the top edges in place, and cut away one of the sections of thin wood from the side of the box. Rule a vertical line down the middle of this section. On each side of this line place the shape of the wing, using as a pattern the shape cut from paper

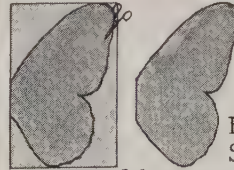


Fig. 36



Fig. 37

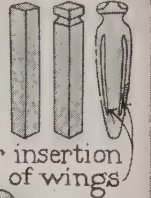
Fig. 38
Slits for insertion
of wings

Fig. 39

(Fig. 37). With a pair of heavy shears, cut out these wooden shapes separately. From a small pine stick about $\frac{1}{4}$ " thick and $1\frac{1}{2}$ " long, whittle a shape that resembles the body of a butterfly (Fig. 38). Cut slits on each side of the back of this body for the insertion of wings, which also must be glued in place (Fig. 39). Short lengths of fine wire, curled at one end and stuck in the head, will suggest antennae, or feelers. Another longer length of wire is to be stuck through the body of the butterfly, as shown in Fig. 40. The other end of this wire is then fastened to a twig, or small stick (Fig. 40). Note the twist in the wire under the body that holds the butterfly in position.

The butterfly may be painted either with oil enamel paints or with opaque water colors. Show-card colors are excellent for such work, but they are water colors, and if they are used, the butterfly must receive a coat of varnish to protect the colors from injury by water. The butterfly shown in Fig. 41 may be painted a dark, intense blue, with white and black markings. If used in a bowl of nasturtiums, its color will form a complementary harmony with the orange tones of the flowers (see color plate, in article COLOR).

Many beautiful color schemes may be arranged by combining these painted butterflies with the right selection of flowers. A yellow and black butterfly will look well with a bowl of pansies; a black and dark-green butterfly, with scarlet geraniums. The fine wire which attaches the butterfly to the stick causes the beautiful shape to vibrate, and apparently to

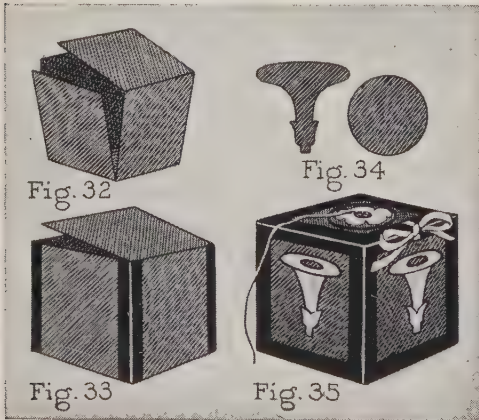


Fig. 32

Fig. 34

Fig. 33

Fig. 35

without wings that are stretched on each side of an axis, flight would be impossible. A butterfly suggests an exercise that well illustrates symmetrical balance, and one that will result in an attractive decoration, to be used in connection with a bowl of cut flowers. A strawberry box is the basis of this bit of construction. On a $2'' \times 3''$ piece of paper, draw

hover over the flowers in a surprisingly life-like way.

Problem 6; A Painted Match Box. If you are handy with tools, you can make many useful objects of wood and decorate them in

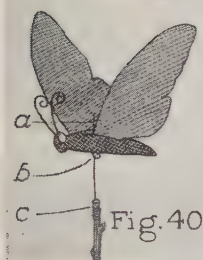


Fig. 41

obedience to the principles of design and color. Oil paints are best for wooden objects. You

will need a cheap white paint for underlay, or filler, and enamel paints in white and colors for the finishing coats and the decorations. The color chart with the article COLOR will help you select beautiful color schemes for these articles.

To make the match box, you will need four pieces of $\frac{1}{4}$ " white wood, cut in the dimen-

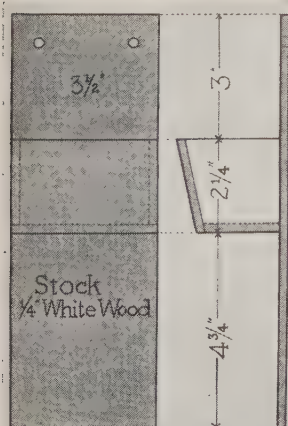


Fig. 42

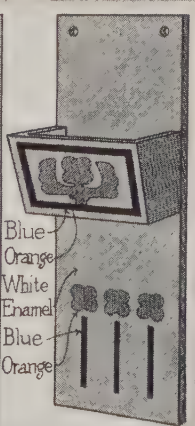


Fig. 43

small brads, and two holes are bored near the upper corners of the back, so the box may be securely hung. When the parts are nailed together, a coat of white underlay paint is applied. When this is dry, the box is given a coat of white enamel. This is allowed to dry thoroughly. The box illustrated in Fig. 43 is decorated with the balanced design given in Fig. 26. The balanced unit is painted orange, and the marginal band is dark blue. The flower-like forms on the lower part of the box are orange, and the stems below them are blue.

A match box of this kind is useful in a kitchen, bedroom, bathroom, living room, or wherever matches are necessary. A box can be painted in any color scheme desired, to match the colors in a particular room.

Problem 7; A Painted Box for Small Silverware. The next problem is even more interesting, for it develops a small wooden box or tray for holding spoons, something for which every family has use.

Quarter-inch white wood is the stock from which the box is made. Fig. 44 is a working drawing, giving the dimensions of all the parts. The joining of the parts is by means of the simple butt joint, and small brads are used to nail the parts together. The openings at the

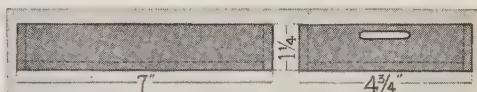


Fig. 44

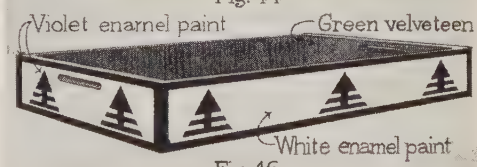


Fig. 46

ends of the box add considerably to the difficulty. These may be omitted if you like, though they make the box look a little more like a tray. When the box is finished, it is to be painted white, both inside and out, first with a coat of underlay and then with a coat of white enamel. When this last coat is dry, the box is ready to be decorated. Any border rhythm or balanced unit that you like may be used for the decoration. Fig. 45 (page 3442) shows three units cut from folded paper. Any of these units might have been used instead of the triangular shape that appears on the box in Fig. 46.

Your box may be lined throughout with velveteen or velvet paper, or you may simply line the bottom. The easiest way to do this is to cut a piece of cardboard a little smaller than the inside measurement of the box. Cover this with velvet paper or velveteen in a color that matches or harmonizes with the color of

sions given in Fig. 42. This is a working drawing, and gives you the facts you will need to know. The parts are nailed together with

your decoration. The velvet paper or velveteen should be cut about an inch larger in each dimension than the cardboard, and should be mitered at the corners, brought smoothly over the edges of the cardboard, and pasted down flat to the under side. This covered cardboard should fit snugly into the box, and should be glued to the bottom. A piece of woolen cloth or felt should be cut a very little smaller than the outside measurement

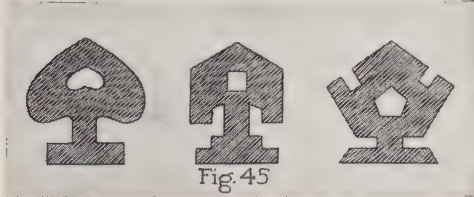


Fig. 45

of the box, and should be glued to the bottom to protect the polished surface of the dining table, where the little tray will undoubtedly be used. Two tones of violet enamel paint may be used in painting the units and the marginal bands in Fig. 46. Green velveteen was used for the lining, which covers the entire inside of the box.

Problem 8; A Door Stop Made from a Painted Brick. In these days of improved habits of living, we have learned of the benefits of fresh air and sunshine. Whether we live in the city or in the country, open windows and doors are necessary to ensure good ventilation. A banging door is an irritation to nerves. Door stops, or door porters, as they are sometimes called, fill a real need, in holding a door back against the wall or open at any angle desired. A door stop must be heavy in weight, not easily upset, simple in lines of construction, and decorative in appearance. A common brick answers all the purposes of use, and a pressed brick is still better. Its straight, sharp edges will not easily chip, and its smooth, hard surface readily takes paint.

A door stop such as shown in Fig. 47 illustrates both rhythm and balance. The elephant shapes used for the decoration of the top are balanced on each side of an axis. They are large and simple in shape, and they are decidedly "heavy" in suggestion. The design used on the sides is a border rhythm of simple units, so spaced as to create interesting background shapes. Another principle of design is illustrated by this object—the principle of harmony. Harmony is the agreement of all parts in a design, in expressing the complete idea. The doorstop is fitted for the use for which it is intended; it is attractive in shape and color; its decorations are well balanced and rhythmic; and it is a complete, unified, and harmonious project. It may well be cited, then, as an example of three fundamental de-

sign principles—rhythm, balance, and harmony.

The working-out of this problem is as follows: The brick is first covered with a coat of white underlay as a filler. Then a coat of orange enamel paint is applied and allowed to dry thoroughly. The rhythmic decoration for the sides is then planned. A piece of paper 1" x 2" is folded on its long diameter (Fig. 48), and a simple "half-shape" is traced upon the fold. The cut-out shape is shown in Fig. 49. This unit of design is spaced and traced on the sides and ends of the brick, to form the border rhythm in Fig. 47. For the decoration of the top, a piece of paper exactly the size of the largest face of the brick is cut and folded on the short diameter. A marginal line is drawn on all sides of this folded paper, about a quarter-inch from the edges. Within this space, the elephant shape is sketched (Fig. 50). This shape is cut from the folded paper, leaving the margins, and resulting in the balanced design in Fig. 51. The tracing of this design on the top face of the painted brick is an easy matter. The blanket shapes

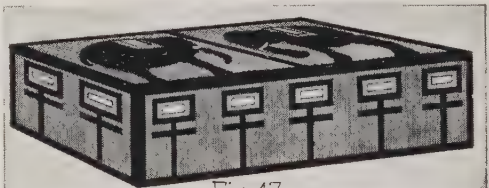


Fig. 47

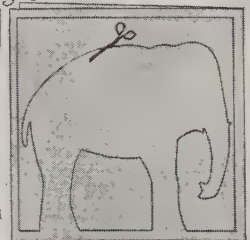
Fig. 48
Paper folded on long diameter and design unit cut with scissors

Fig. 50

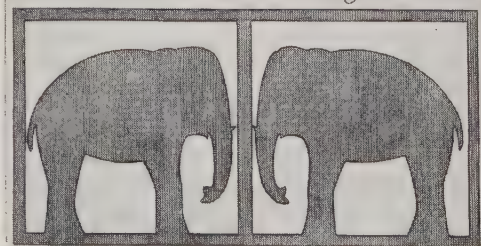


Fig. 51

are next drawn. These are painted white, leaving a border of orange, and the elephant shapes are painted black. White tusks and a white spot to suggest a sagacious eye are the finishing touches. The marginal bands which reach the edge of the brick are painted black.

In the border rhythm, the use of black and white enamel paints is plainly shown in Fig. 47.

Problem 9; The Possibilities of Olive Bottles. You will begin to think that art can transform any worthless thing into something useful and attractive. This is not wholly true, for some objects are made in proportions that are not esthetic, although these proportions may be necessary or best for the use or function of the object, and therefore are in a sense beautiful. The ordinary Mason fruit jar used for home canning is a case in point. No amount of decoration could change the commonplace proportions of this jar, nor make it a suitable receptacle for flowers, nor give it the right to be called a "vase"; but with olive bottles, the case is different, for there we see refinement of proportion and contours that are graceful. When we are sure of fine proportions and good outlines as a basis, we can with propriety begin to think about adding decorative elements in shapes and colors.

Proportions are wonderfully important in design. The beauty of a Greek vase is almost wholly a matter of proportion. We speak of a man or a woman as having a finely proportioned figure. This means that such a person is neither too short nor too tall, too thin nor too stout. Even a sheet of paper for a letter or a book page is planned to be in suitable proportions, both for use and for the "looks of it," which means the consideration of beauty. Designs which are planned with regard to the proportions of an object, and which take into consideration the line of construction on which the object is built, are called *structural designs*. We shall develop structural designs in the next two problems.

These decorated olive bottles make most satisfactory flower-holders, especially when the colors are planned in relation to certain flowers that complete the color schemes and produce a wonderful harmony. Fig. 52 illustrates a bottle planned to hold the gorgeous African marigold. It might also be used with brown-eyed Susans, with goldenrod, or with yellow chrysanthemums. Its decoration is simply a matter of structural proportion. The bottle is about ten inches high; more than half of it is painted a brilliant orange, with enamel paints. More than half of the remaining height is painted intense yellow, and the rest of the bottle a fine yellow-green. When these colors are dry, bands of black enamel paint are added where the colors meet, and at the top. When this is dry, the whole bottle is given a coat of white copal varnish. The result is a striking color combination, and when a few long-stemmed marigolds, with their green leaves and gorgeous blossoms, are placed in the bottle, the effect is startling in its brilliant beauty.

Fig. 53 shows another ten-inch bottle painted

as a receptacle for scarlet sage, or salvia. The lower part is painted a fine green; the neck, white; and the "collar," scarlet, all with enamel paints. When these colors are dry, the white stripes are added. They are about a quarter-inch wide and are painted freehand, with a No. 3 water-color brush.

The bottle shown in Fig. 54 was planned to hold a sweet, old-fashioned flower, mourning bride—*sweet scabious*, the botanists call it.

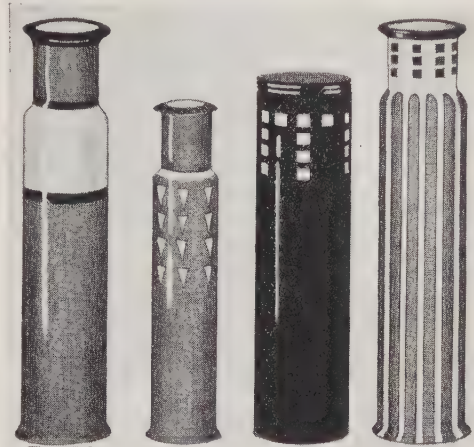


Fig. 52

Fig. 54

Fig. 55

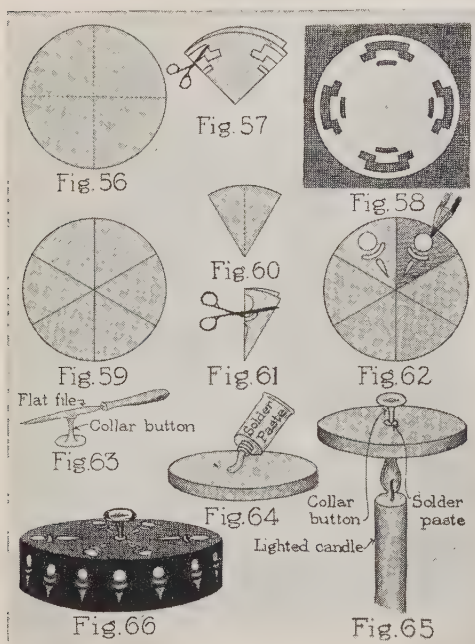
Fig. 53

This is a shorter bottle than Figs. 52 and 53, being only seven and one-half inches high. The lower part is painted medium violet, made by mixing cardinal-red, ultramarine-blue, and white enamel paints; the neck, a yellowish-pink, made by mixing vermilion and white enamel paints. The collar repeats the violet note of the lower part. When these preliminary coats are dry, rhythms of white triangular shapes are painted in a vertical direction on the violet background. There are six of these rhythms around the bottle, painted freehand. A separating band of white is also painted where the violet coat meets the light vermilion on the neck. In this bottle, pink, white, and violet asters also look extremely well.

Fig. 55 shows another interesting decoration. Here the bottle is eight and three-quarters inches high and two and one-half inches wide. The entire bottle is painted black. When this coat is dry, a design of white squares is painted near the top. The simplicity of this black and white scheme heightens the effect of yellow dahlias placed in the bottle.

There is no end to the color effects and the color combinations that can be secured by using these painted bottles in connection with our best-known garden flowers. It does not take an artist to secure these interesting results, but it does take understanding of the principles of design and knowledge of color. Such information is within the reach of all.

Problem 10; Redeeming a Marshmallow Box. Not every tin container is fine in proportion, but many boxes in which tea, preserved fruits, and candies are packed have this quality, and in addition, are so attractively shaped as to be worthy of bright-color decoration. There are many uses for such boxes.



The circular marshmallow box, made of tin, is especially well adapted to the development of our last problem in this series.

In carrying out the idea of structural design, it will be necessary for us to plan a design for a circular space. There are various ways of doing this. Let us again resort to the device of paper-cutting. First, draw with compasses a circle about four inches in diameter; this is probably a little smaller than the top of the box. Fold the circular paper on a vertical and a horizontal diameter (Fig. 56). Upon the folded quadrant, sketch a simple shape or two half shapes, as shown in Fig. 57. Cut out the shape or shapes, and the result will be something like Fig. 58. Such a design is structural because it is based on the lines of the construction of the form which encloses it.

Another method of planning a design for a circular shape is shown in Figs. 59 to 62. Here two four-inch circles are drawn; by setting off the length of the radius, each circumference is divided into six equal parts. Three diameters are ruled on each circle, connecting the opposite points of division on the circumferences. A segment is then cut from one of

the circles (Fig. 60) and folded on its axis (Fig. 61). A half shape is drawn upon the folded segment, and cut out. The result is a balanced unit of design. This unit is placed on each of the segments of the circle which remains uncut. The repetition about a center which is seen in this design is known as *radiation*, because the different parts of the design seem to radiate from a common center like the spokes of a wheel or the petals of a daisy. Radiation is sometimes mentioned as a principle of design.

Before the circular design is placed upon the top of the marshmallow box, there is another interesting operation to perform. Our gift box should be provided with a handle. A discarded brass collar button exactly suits our purpose. The center of the upper side of the cover must be scraped with a knife to make it rough. The small end of the collar button must be filed for the same purpose (Fig. 63). There is a certain kind of solder called *solder paste* which must now be used, for ordinary solder will not answer. Solder paste is put up in tubes, like library paste or dental cream, and can be squeezed in small quantities from the tube. Apply a little of this solder paste to the center of the cover, and to the small end of the collar button. Place the small end of the collar button exactly in the center of the upper surface of the cover, and hold it in place over a lighted candle or match, as shown in Fig. 65. As soon as the paste bubbles from the heat, fusion of the metals has taken place, and the flame may be extinguished.

Your box may now be painted black, dark blue, or green, with enamel paints or japalac. This coat must be allowed to dry overnight. Then the design which you cut from the circular piece of paper may be fitted on the top and traced. A simple border rhythm must be planned for the sides. This is best done by cutting a strip of paper as wide as the height of the box, and long enough to reach around it. In Fig. 66 the unit cut for the top (Fig. 62) was spaced for the decoration of the sides. The border rhythm should be spaced and drawn on the strip of paper, and each unit cut out. The strip thus becomes a stencil, by means of which the decoration can be placed on the sides of the box. The color scheme of the box illustrated in Fig. 66 may be dark blue, white, and orange. Any design and any harmonious color scheme can be used.

In carrying out the problems which require the use of enamel paints, you will need black, white, yellow, ultramarine-blue, light green, cardinal-red, and vermillion. There are numerous makes of good enamel paints on the market. See *HOUSEHOLD ARTS IN EDUCATION*.

INDUSTRIAL EDUCATION. See *TECHNICAL AND INDUSTRIAL EDUCATION*; also *VOCATIONAL GUIDANCE*.

INDUSTRIAL EXPOSITION. See EXPOSITION, INDUSTRIAL.

INDUSTRIAL LEGISLATION. See LABOR LEGISLATION.

INDUSTRIAL SCHOOL. Institutions in which the industrial arts are taught are loosely grouped together under this name, but the term is gradually being replaced by others more exact in meaning. To this group belong public institutions in which young and neglected children, or boys and girls who need corrective influences, are taught useful occupations for the purpose of developing mind and character and in order to equip them with means of making an honest livelihood; these institutions have been known heretofore as reformatories, or reform schools (which see), but such terms are being abandoned in favor of the term "industrial school." Vocational training of a more advanced character is given in the public schools of the larger towns and cities, and the various trades are taught in institutions known as trade schools. See VOCATIONAL GUIDANCE; MANUAL TRAINING; TECHNICAL AND INDUSTRIAL EDUCATION. M.V.O'S.

INDUSTRIAL WORKERS OF THE WORLD, or the "I. W. W.," popularly known as "I Won't Work" (a humorous word-play on its initials), is a labor body whose policies are wholly revolutionary. It is not recognized by the great mass of workmen of America, who are affiliated with legitimate labor movements; indeed, they oppose the I. W. W., declaring it to be inimical to the cause of labor.

The movement had its origin in Chicago in 1904, and while the headquarters remain in that city, the main strength of the organization is in the lumber and mining areas of the Pacific states, although it has gathered strength throughout the West and has made its propaganda felt in great manufacturing centers elsewhere. As far east as the Atlantic seaboard, in Massachusetts, it has caused much disturbance in labor circles.

The Industrial Workers' program is subversive of law and order. In an elaborate platform of principles is the declaration that "the working class and the employers have nothing in common"; that a struggle must be waged "until the workers [the I. W. W.] take possession of the earth and the machinery of production." Instead of the conservative motto, "A fair day's wage for a fair day's work," the demand is made for abolition of the wage system. The Soviet régime in Russia, which attempted to put into operation the principles advocated by the I. W. W., is lauded by the American organization.

The Industrial Workers do not believe that contracts between employers and employees are binding. A contract with an I. W. W. is considered by him to be only a means of furthering the peculiar interests of his organization.

He believes in sabotage (which see), and uses it as an effective weapon; he will join a strike only when it will inflict the greatest financial losses upon his employer.

During the World War, the rank and file of pronounced I. W. W.'s were a serious menace to the country, particularly in the Pacific Northwest, where disturbances continually embarrassed the government in its war activities. More than a hundred leaders of the organization were convicted of disloyalty to America and of attempts to cripple the nation in dealing with the enemy; these were sentenced to prison for terms of from one to twenty years, but eventually most of them were pardoned.

INDUSTRY, in economics, is another name for business, but has direct reference to manufacturing, selling, and distributing, in which labor and capital are massed to supply a general or local need and achieve profit. Industry is in reality a general term for numerous highly diversified, separate, and distinct lines of business activity, each of which is itself an industry. For example, the construction of automobiles is a giant industry, but it is subdivided into many smaller industries; one company manufactures only motors, another makes steel or wood bodies, others provide wheels, meters, spark plugs, etc. Such subdivisions reveal that no industry can sustain itself independently. One cannot name a commercial line that is not dependent upon many others; even the baking industry, which might be assumed to stand alone and unsupported, relies entirely upon the products of other lines to provide materials to satisfy the natural demand for its products.

There is one basic industry in the world—agriculture. Were it to cease to function for even a year or two, the nations would perish. Inversely, agriculture itself would revert to the primitive if the flow of modern aids to the farmer were to cease. This is another and more significant instance of the interdependence of the workshops of mankind.

The aim of a group of persons who organize an industrial enterprise is the production of a commodity which will supply a demand felt by those who live by another industry. As life becomes more complex, the fields of the business man and the artisan broaden.

Related Subjects. The great industries and others related to them, as well as subjects less directly connected with industry, are treated in these volumes under the following headings:

Advertising	Brick and Brick-Laying
Agriculture (with list)	Building (with list)
Aircraft	Building Stone
Automobile	Button
Banks and Banking	Cable, Submarine
Books and Bookbinding	Carpentry
Board of Trade	Carpets and Rugs
Boots and Shoes	Cement
Brewing	Cloth

Coal	Matches
Cotton	Meat and Meat Packing
Department Store	Metallurgy
Distillation	Mining
Dress (with list)	Moving Pictures
Dyes and Dyestuffs	Musical Instruments
Electricity (with list)	Newspaper
Electroplating	Paper
Electrotyping	Perfume
Engineering (with list)	Petroleum
Engraving	Phonograph
Etching	Photo-Engraving
Explosives (with list)	Photography
Factory and Factory System	Plastering
Fish	Plumbing
Flax	Pottery (with list)
Flour	Printing
Food Products, Preservation of	Quarry and Quarrying
Foundry	Radio Communication
Fur and Fur Trade	Railroad
Furniture	Refrigeration
Gas	Roads and Streets
Gems	Rubber and Rubber Manufacture
Glass	Silk
Gum, Chewing	Soap
Hat	Spinning
Hotel	Stereotyping
Ice	Sugar
Insurance	Stock Exchange
Iron and Steel	Tanning
Lithography	Telegraph
Lumber	Telephone
Machine (with list)	Tobacco
	Weaving

INERTIA, *in ur' shih ah*. A favorite trick among boys is to place a coin on a card, balance the device on the end of the forefinger, and snap the card out, leaving the coin on the finger. Tie a small cord to a hammer or a flatiron and jerk the hand up quickly. The cord will break, but if you pull steadily, the weight will be lifted. Try to turn a sharp corner and remain exactly upright when you are running rapidly. What happens? All these experiments illustrate *inertia*, which is a universal property of matter. Stated scientifically, the law of inertia is as follows:

A body at rest remains at rest, and a body in motion moves in a uniformly straight course unless acted upon by some exterior force.

Because of inertia, some outside force must be supplied to produce or to arrest motion; the heavier the body, the greater the force required. It requires just as much force to stop a body in motion as is required to produce the motion. For example, it requires as much force to stop a railway train running forty miles an hour as was used in giving the train its speed. Serious accidents occur to automobiles and on railways because the moving bodies cannot be instantly stopped and so prevent collisions. See the articles **FORCE**; **MATTER**.

A.L.F.

INFALLIBILITY, **PAPAL**. See **POPE**.

INFANT, in common law, a term applied to anyone under a specified age, regardless of sex. The age limit is twenty-one in most jurisdictions, but in some states, special statutes fix the age of eighteen as the end of a

woman's period of infancy. Those who are known as infants are limited by law, as a matter of their protection. For instance, they cannot convey title to land, bind themselves by contract except for necessities, marry without consent of parents or guardians, or perform certain other legal functions accorded adults. Marriage, as an accomplished fact, is generally sustained by the courts, although frequently set aside and nullified for cause. See **AGE**.

INFANT BAPTISM. See **BAPTISM**.

INFANTILE PARALYSIS, *in' fan tile pa-ral' ih sis*, a disease to which children are especially susceptible, and which sometimes attacks adults. Its scientific name is *anterior poliomyelitis*. It is much dreaded because it is attended by paralysis of the muscles, due to infection of the spinal cord with poison introduced into the system by a germ. It is essentially a summer disease, August and September being months of highest incidence. The special microbe causing the infection is too minute to be identified through the microscope, but is capable of passing through a laboratory filter. At various times after the disease was first definitely recognized, in 1840, epidemics appeared both in Europe and America. The most serious outbreak in the United States occurred in New York City in 1916.

The disease does not spread in the same manner as does smallpox or diphtheria, but is transmitted by the most roundabout routes. Ten or twelve cases may appear in one neighborhood, and another group be in a different neighborhood, from one to three or four miles away. Often there will be but one case in a single family or apartment building. In other words, the control of the disease has been made especially difficult because it is as yet impossible to trace the source of any single case. It has been aptly described as a "pestilence that walketh in darkness." At the same time, health authorities unite in urging parents of young children to take stringent precautions against it. It is thought by some that the disease is spread by persons having so mild an attack that the symptoms are not recognized. The period of incubation is about six days, on the average.

Symptoms. Early symptoms are fever (not usually higher than 103°), vomiting, bowel disturbances, and headache. Accompanying these there may be symptoms associated with other diseases, such as sore throat and infected tonsils, discharges from nose and eyes, and a distressing cough. Specially characteristic of infantile paralysis, however, are the pains that occur in the legs and feet, stiffness of the neck, and sensitiveness of the spine. Following this there may be delirium and convulsions. Diagnosis of the disease is difficult whenever the resulting paralysis is slight or transient,

and to overcome this difficulty, physicians test the muscles by a specially devised apparatus.

While there are some cases in which paralysis develops rapidly, such is not the rule. In the ordinary case, there are several days in which the disorder seems to be nothing more than a fever or a bowel complaint. Some think the average case never goes beyond this state. However, in many cases the mother presently notices that holding the child or moving him causes pain. Next she notices that he is weak, say, in one leg, or even only in the muscles which move the toes on one foot. Later still, she is able to notice wasting or shrinking of the muscles of one leg or of one group. It is this great muscular shrinking or wasting, generally coming on during convalescence, which is responsible for the public dread of the disease.

Treatment. The injection into the spinal column of blood serum taken from a person cured of the disease has been found to be the most helpful single remedy. The treatment of infantile paralysis is still in the experimental stage, and much advancement in this particular field is hoped for. Doctors advise the most careful nursing, including the application of heat to paralyzed limbs. Cases that recover sometimes require months of persistent effort to prevent permanent weakness of the limbs. In some instances, the paralyzed limbs are too tender to be touched for some time after the beginning of the attack, but massage may be commenced within two weeks in mild cases. Manipulation and massage or electrical treatments, directed by a reliable physician, are considered absolutely essential, and they must be kept up as long as there is evidence of weakness. However, these exercises must never be carried to the point where the muscles are unduly fatigued or stretched. Otherwise, the muscles will shrink and the child become permanently lame. Surgical appliances, such as braces or splints, are often resorted to to prevent lameness or deformities.

Preventive Measures. When any community is subjected to the peril of infantile paralysis, all of the children should be protected in every possible way. They should be kept scrupulously clean and their diet should be watched carefully. Raw fruit and vegetables that are unripe or over-ripe, or that have been exposed to flies or dirt, must not be eaten, and the mother must restrain the child in his fondness for candy, soda water, ice cream, and ice water. Do not patronize street vendors of fruits and vegetables, or food merchants who do not keep their premises in a strictly sanitary condition, is one warning of the physician. Flies, neglected garbage, and sick animals about the house must not be tolerated. It is also

wise to keep the children out of all crowded places. Health authorities insist on strict quarantine rules, all victims of the disease being isolated in their homes or in hospitals. Persons known to have been exposed to the disease are also placed in quarantine. W.A.E.

INFANT MORTALITY. Until comparatively recent years, the death rate among infants was so high that only a high birth rate kept the nations from having diminishing populations. Queen Anne of England, who came to the throne in 1702, was the mother of seventeen children, but only one of these lived to be more than a year old. The infant-mortality rate in the first year of life, representing the death rate from all causes, is about sixty-six for each thousand babies born. Fifty years ago, it was well over two hundred, so far as we can judge. In this and most other enlightened countries, vital statistics relating to babies show that the percentages of infant mortality are steadily declining. Medical knowledge and the spread of information among mothers are responsible for this change. The methods that have been put into practice in this movement are told elsewhere in these volumes in the article BABY. W.A.E.

INFANTRY, *in' fan trie*, the most important branch of an army, consisting of men who march and fight on foot and are armed with hand weapons. The armies of the ancient Greeks were composed of infantry, and when in the formation known historically as the phalanx (which see), they proved everywhere invincible. The phalanx was also adopted by the Romans, who undoubtedly produced the finest infantry known up to modern times. Mounted troops, or cavalry, played a very subordinate part in old Roman warfare. In the Middle Ages and the days of chivalry, horsemen came to be regarded as the only real fighting men, and foot soldiers were regarded as a mere mob.

The great battles of Crécy (1346), Poitiers (1356), and Agincourt (1415) were, however, won by English infantry, or archers, fighting in conjunction with mounted men who had previously regarded all foot soldiers as almost useless. Infantrymen were afterward esteemed not only as good fighting men, but as the most essential part of an army. The weapons of the Romans and Greeks were adapted to close-quarter fighting, but with the perfection of the bow and the introduction of the crossbow or arbalest, English archers became so expert that from a distance they could pour into the enemy's ranks a galling fire of arrows which prepared the way for cavalry charges.

The introduction of modern artillery again made necessary many changes in tactics and formation. The solid mass of men who might withstand the fire of bows and arrows could be swept off the earth by the fire of artillery,

projectiles from which would plow through rank after rank. Consequently, modern infantry has been developed on lines demanding the abolition of close formation and the adoption of tactics embodying open formation, or "extended order," with intervals between men to render the enemy's fire less effective than if directed against a mass. In the United States, this open formation was adopted in the War of Secession (1861-1865). In the Boer War (1899-1902), the British losses in the first engagements were serious on account of close formation; the losses greatly diminished as soon as the open-order formation was adopted. In the beginning of the World War (1914), the German troops in the early stage adhered to close formation, their losses being consequently heavy. See ARMY.

INFECTION, *in fek' shun*. See FIRST AID TO THE INJURED; DISEASE (Disease in the Human Body).

INFERIOR COURTS OF THE UNITED STATES. See SUPREME COURT OF THE UNITED STATES, subhead.

INFERIOR MAXILLARY. See HEAD, illustration.

INFERNAL MACHINES. See BOMB; EXPLOSIVES.

INFINITIVE. In the sentence, "He travels constantly," the verb *travels* expresses definite action on the part of its subject, *he*; and to agree with that subject it is limited to the form for the third person singular. In the sentence, "He loves to travel," the finite verb which does the asserting is *loves*; the verb-form *to travel* is really used as a noun, the object of *loves*, and merely names the action of traveling, assuming the action instead of affirming it. This is called the *infinitive* use of the verb. Usually the infinitive is preceded by *to*, called the *sign of the infinitive*.

Being unlimited, the infinitive has the same form at all times, no matter what may be the person and number of its subject. It may be either active or passive, but it has only two tenses—present and perfect: *to see*, *to be seen*, expressing present tense, active and passive voice, respectively; *to have seen*, *to have been seen*, expressing perfect tense, active and passive voice. Infinitives are so much like verbs that they may take objects, complements, or modifying adverbs, and yet they may also serve in the capacity of noun, adjective, or adverb. In this respect they are like the participles, and both infinitives and participles are often grouped under the general name of *verbals*.

As to the **Split Infinitive**. To insert any word or words between the verb and its sign is to "split the infinitive." The indiscriminate splitting of infinitives marks the careless or ignorant speaker, and, although there has been much argument over the matter, the practice of separating the verb from its sign by an

adverb is not yet admitted to the ranks of good usage in all cases. The violations of the rule by writers and speakers have not yet served to establish the "split infinitive."

On the other hand, there has been a change from the old idea that this practice was a grave offense, never to be tolerated. It is agreed that there are some occasions where the meaning cannot be made clear or exact unless the adverb is placed between the verb and its sign, or where forcefulness is gained by the change. In the majority of cases, however, it is neither necessary nor forceful to split the infinitive. "*Really to understand* the situation, you will have to go there in person," is quite as clear and forceful as "*To really understand* the situation, you will have to go there in person."

Common Errors. The use of one tense where the other is required, and the splitting of the infinitive without good reason, are the principal sources of error in connection with the infinitive.

I should be greatly pleased to have gone, for I should have been greatly pleased to go. The act of going refers to a later time than the pleasure, and time subsequent to that of the principal verb requires the present infinitive.

It was our duty to have written, for It was our duty to write. Here the same time is denoted: *It was our duty* (then) *to write* (then). Coincident time also calls for the present infinitive.

Rome is supposed to be founded by Romulus, for Rome is supposed to have been founded by Romulus. Since the mythical founding is a matter of the far-away past, while the supposing is present time, the infinitive must take the perfect form.

I am going to go West next year, for I am going West next year. The infinitive is redundant.

You will please not to say anything about the matter, for You will please not say anything about the matter. After *please* the sign of the infinitive is dropped.

He bade her to enter, for He bade her enter. When *bid* is used actively and positively, *to* is omitted. When the verb is negative or passive, the sign is retained; as *He bade her not to enter; She was bidden not to enter.*

Try and come early, for Try to come early. The meaning intended is not *try*, but *try to come*, as is made plain if we reverse the two verbs: *Come early and try*. This is a very common error with those who forget that *try*, *endeavor*, and equivalent expressions, like *make an effort*, need the infinitive to complete their meaning, and not another finite verb connected by *and*.

The child was told to not stir from the spot, for The child was told not to stir from the spot. Here the splitting of the infinitive serves no useful purpose and only indicates ignorance of the rules of grammar or carelessness in applying them.

INFLAMMATION, a morbid process accompanied by swelling, redness, heat, pain, and blood congestion, with functional derangement. Inflammation may be *acute*, or active; *adhesive*, or promotive of healing; *catarrhal*, involving a mucous surface; *chronic*, with for-

mation of new connective tissue; *specific*, due to microorganisms; *suppurative*, accompanied by pus; and *toxic*, due to poison. Inflammation is a process of nature designed to rid the system of extraneous or poisonous elements, or to restore arrested circulation due to an obstruction. The blood vessels of the affected part dilate, and the blood is accelerated and then slows down; the white corpuscles lag along the sides of the vessels, and linger there if the inflammation increases. These white corpuscles gradually pass through the wall of the blood vessel, forming minute buds on the outside of veins and capillaries, where the plastic lymph accumulates. In intense inflammation, arrest of the blood in the affected part takes place. The excess of blood to the part affected causes the redness, and the distended blood vessels cause the swelling, together with the effusion of the white and red blood corpuscles. Exudation and pressure of the expanded vessels upon sensory nerves cause the pain.

The progress of inflammation is checked by *resolution*, or absorption by the lymphatics of the products of the inflammation; by *suppuration*, or the throwing off of exuded blood corpuscles and dead tissue through the formation of pus; or by *ulceration*, which leaves a sore that heals by scarring. *Mortification*, or gangrene, may also occur in severe forms. Inflammation accompanies many specific diseases, but the presence of microorganisms as one of the principal causes of inflammation is now well recognized.

INFLAMMATION OF THE BOWELS.

See APPENDICITIS.

INFLAMMATORY RHEUMATISM. See RHEUMATISM.

"IN FLANDERS FIELDS," one of the most famous poems inspired by the World War. See MCCRAE, JOHN; POPPY.

INFLATION OF CURRENCY. See MONEY (Paper Money).

INFLECTED LANGUAGES. See LANGUAGES OF THE WORLD (Kinds).

INFLECTION, in *flek' shun*. There is an expressive figure of speech wrapped up in the word *inflection*, for it comes directly from a Latin word meaning *bending*. Inflection is a modification or change in the form of a word by which it is bent to some use or meaning not possessed by its simple, or uninflected, form. In the sentence, "She will go sailing in her uncle's yacht," the words *will go*, *sailing*, *her*, and *uncle's* are all inflected forms, being variations of *go*, *sail*, *she*, and *uncle*. Only five of the eight parts of speech are subject to inflection—nouns, pronouns, verbs, adjectives, and adverbs.

Inflection is accomplished in three different ways: first, by a change in the ending, as in the case of *sailing* and *uncle's* in the sentence

quoted; second, by the use of an auxiliary, as in the case of *will go*; third, by the use of an entirely different word, as in the case of *her*. The inflection of a noun or a pronoun is called its *declension*. Nouns are inflected for number, gender, and case, and pronouns for these and for person as well. The inflection of adjectives and adverbs is called *comparison*, and that of a verb its *conjugation*.

Related Subjects. These various inflections are explained fully in the following articles in these volumes:

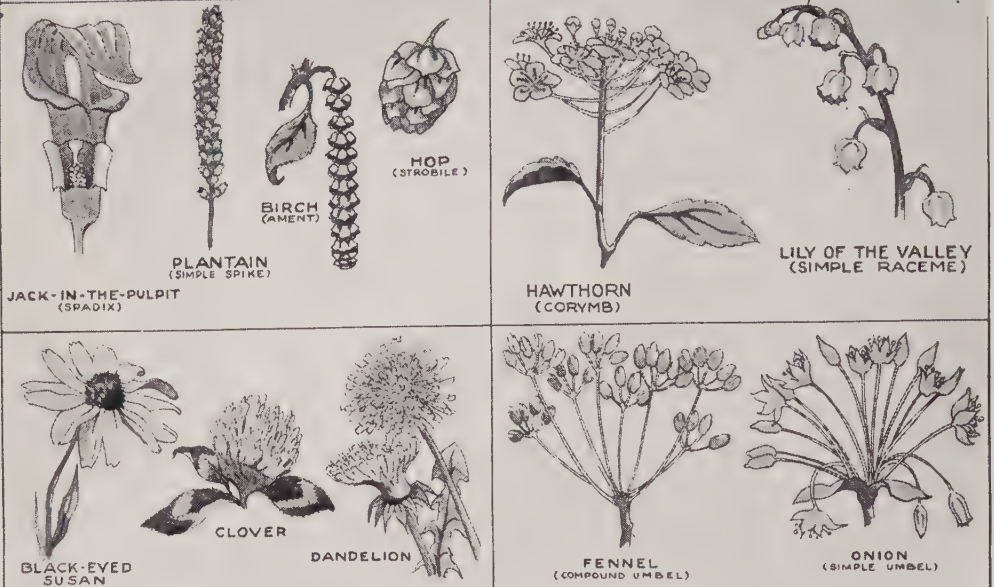
Case	Gender
Comparison	Number
Conjugation	Person
Declension	

INFLORESCENCE, in *floh' es' ens*, the name given in botany to the arrangement of the blooms on the flower-bearing part of the stem. There are two main kinds of inflorescence—*determinate* and *indeterminate*, or, as they are sometimes called, *cymose* and *racemose*. In the former, each flower stalk, including the principal one, is ended definitely by a blossom; in the typical flower cluster, known as the *cyme*, the older blossoms are in the center and the newest on the outside, the whole forming a flat-topped cluster. The forget-me-not and heliotrope flower clusters are cymes. In indeterminate inflorescence, the flowers are borne on small branchlets arising from the main axis. The latter is of undetermined length, and is never ended by a terminal flower (see **RACEME**; and **BRACT**, for illustration). The red currant is a typical *raceme*. See page 3450. B.M.D.

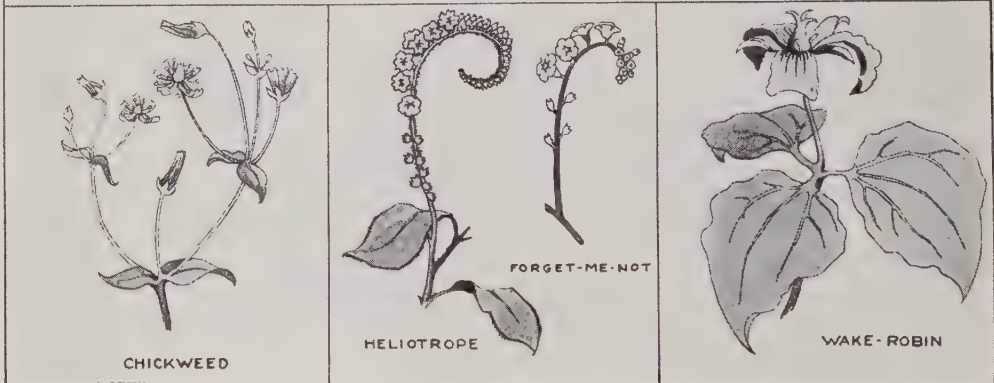
INFLUENZA, in *floo en' zah*, OR **GRIPPE**, *grip*, an infectious disease that sometimes travels in epidemics entirely around the world. Such a *panepidemic* occurred in 1918-1919, beginning we know not where and spreading over Europe and later to America. The high death rate at this time was due partly to the complications accompanying the disease. Pneumonia, bronchitis, mastoid, sinus infection, and other ailments were present in a large number of cases and greatly aggravated the situation. It is customary now to call most severe colds influenza or gripe (shortened form of the French term *la grippe*), and cases of true influenza are sometimes dismissed as hard colds. Actually, colds are due to a considerable variety of germs, while a special virus is believed to be the cause of true influenza. It has not yet been identified, but it is probably present in secretions and other discharges from the nose and mouth of an infected person. The disease is spread from person to person by these discharges.

Symptoms and Treatment. The symptoms of a typical attack are headache, chills, fever, and an aching feeling in the joints of the body. If properly treated, the patient usually recovers in a week or ten days, but the germs of

INDETERMINATE OR RACEMOSE INFLORESCENCE



DETERMINATE OR CYMOSE INFLORESCENCE



INFLORESCENCE: THE BUDDING AND UNFOLDING OF BLOSSOMS (SEE PAGE 3449)

other diseases find influenza patients easy victims. Another characteristic of this disease is the length of the convalescence period. A feeling of lassitude and depression lasts much longer than the acute symptoms. In this period, too, the weakened condition makes the patient susceptible to other diseases.

An attack of gripe can usually be conquered at the beginning by means of certain decisive measures and remedies. These include the administration of laxatives to ensure free bowel action, hot mustard foot baths to induce perspiration, hot drinks, such as lemonade, and a dose of quinine. Above all, the patient must have absolute rest in bed. If the attack is somewhat severe, it is well to have a physician take charge of the case. A developing case

can often be cut short by the victim's going to bed, taking a purgative, and drinking water freely.

When a community is invaded by an epidemic of influenza, the well can help to avoid the disease by keeping away as much as possible from crowded halls and public conveyances. It is also advisable to take especially good care of one's general health. W.A.E.

INFRA-RED RAYS. See LIGHT (Length of Light Waves).

INFUSORIA, *in fu so' rih ah*, a highly specialized division of one-celled animals (see PROTOZOA). Originally, the name was applied to all the microscopic animals which were discovered in *infusions* of vegetable matter, but scientists now restrict the term to those pro-

tozoans which possess, at some time in their life history, hairlike appendages, called *cilia*, that aid them in locomotion and in capturing their food. Most infusorians are water animals, and they breed most rapidly in stagnant water exposed to the sunlight. The germ which causes influenza was isolated in 1929. See VORTICELLA.

S.H.S.

INGALLS, *in' galz*, JOHN JAMES (1833-1900), for eighteen years a United States Senator, was born at Middleton, Mass. He was graduated from Williams College in 1855, and in 1858 removed to Atchison, Kan., where he practiced law and became interested in the anti-slavery movement then agitating the state. For many years he was editor of the *Atchison Champion*. In 1873 he was elected United States Senator from Kansas, and was reelected in 1879 and in 1885. Ingalls was noted for scholarly attainments, was a brilliant writer and eloquent speaker, and excelled in the power of descriptive writing. He attracted attention in his later years by his literary talent; his best-known poem, *Opportunity*, printed below, is destined to live:

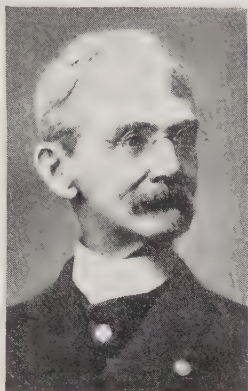


Photo: Brown Bros.

JOHN JAMES INGALLS

Master of human destinies am I!
Fame, love, and fortune on my footsteps wait;
Cities and fields I walk; I penetrate
Deserts and seas remote, and passing by
Hovel and mart and palace—soon or late
I knock unbidden once
at every gate!

If sleeping, wake; if
feasting, rise before

I turn away. It is
the hour of fate,

And they who follow
me reach every state

Mortals desire, and
conquer every foe

Save death; and those
who doubt and hesitate,

Condemned to failure,
penury, and woe,

Seek me in vain and
uselessly implore.

I answer not, and I
return no more!



Photo: Brown Bros.

JEAN INGELOW

INGELOW, *in' je-lo*, JEAN (1820-1897), an English poet and novelist, born in Lincolnshire. Her fame was established in 1863 by the publication of her *Poems*. This collection passed through twenty-

three editions and contained, among other poems, *High Tide on the Coast of Lincolnshire* and *Divided*. Later publications included *Songs of Seven*, *Poems of the Old Days and the New*, and the novels, *Off the Skelligs*, *Sarah de Berenger*, *Don John*, etc. Jean Ingelow was at her best in descriptive lyrics, although her novels possess much of the charm of her poetical writings. Her faults were the lapses into affectation and the use of stilted expressions.

INGERSOLL, *ing' gur sol*, ROBERT GREEN (1833-1899), an American lawyer, lecturer, orator, and writer, who became widely known throughout America as a pronounced opponent of orthodox Christianity. For his subject matter he drew largely on the works of Thomas Paine (which see). Ingersoll was born in Dresden, N. Y., the son of a Congregational clergyman. After the removal of the family to Illinois, Robert took up the study of law, was admitted to the bar, and later entered politics as a Democrat. In 1862 he took part in the War of Secession, serving as colonel of the Eleventh Illinois Cavalry. After the war, he became prominent in Republican politics, securing national fame in 1876 by reason of a stirring speech delivered in behalf of James G. Blaine at the Republican national convention at Cincinnati. He was also notably successful as a lawyer for several large corporations.



Photo: Brown Bros.

ROBERT G. INGERSOLL

Writings. Ingersoll's published works include *The Gods*, and *Other Lectures*, *Some Mistakes of Moses*, and *Great Speeches*.

INHERITANCE OF INTELLECTUAL AND MORAL TRAITS. See HEREDITY.

INHERITANCE TAX, a tax levied by law upon property which descends by will or otherwise to heirs or legatees. For over 2,000 years, this has been one of the important sources of government revenue, the original levy having been made in Rome before the Christian Era. Governments of Europe upon their organization have in nearly every instance adopted the plan, though with modifications and improvements upon the Roman method. Inheritance taxes in England and Germany have for many years provided a very large revenue, and in those countries to-day, they are called "death duties." The Dominion government does not impose such a tax, but the Canadian provinces are permitted to make

it a part of their source of revenue. In the United States, during the War of Secession, Congress passed an inheritance tax, but it was repealed with the restoration of peace. A tax was also levied in 1898, during the war with Spain, and later repealed (1901). In 1916, when there was a prospect of American participation in the World War, Congress again imposed heavy inheritance taxes. Nearly every state in the Union has an inheritance tax in force, but Florida has made the levying of such a tax unconstitutional.

An inheritance tax is approved by practically all economists, but has been fought by the well-to-do, particularly in the United States, on the ground that it is a direct tax, and therefore illegal, because, according to the Constitution, direct taxes must be apportioned among the several states according to population. The courts have declared that such a tax is equally imposed upon all classes, and that it is neither a direct tax nor a property tax, as those terms are legally viewed. Usually, the law exempts small inheritances from taxation, although in some states, all estates above \$1,000 come within its operation. See TAX AND TAXES. E.J.

INHIBITION. See WILL (psychology).

INITIATIVE, *in ish' ih a tiv*, and **REFERENDUM**, *ref ur en' dum*, political measures designed to give the entire body of people of a state or city what amounts to control of important legislation. Wherever they are invoked, legislative bodies are deprived of independent action in lawmaking. To *initiate* is to perform the first act, or to set on foot; the *initiative*, then, is the power of commencing or of taking the first steps in the making of laws. *Referendum* is derived from *refer*, and means *to bear or carry back*; the word, then, relates to laws duly passed by legislative bodies which are referred back to the people for approval before they can become effective. Initiative and referendum principles as usually written into the statutes do not entirely take the place of the lawmaking body, but rather hold a steady hand over legislation. Taken with the newer political principle, the recall, the three represent the most advanced theories of self-government in the direction of restoring power to the people which heretofore has been wholly delegated to their representatives.

The initiative is a comparatively recent development, but the referendum has been employed with success under varying political conditions for years. Since 1874 it has been a part of Switzerland's basic law, and in that country, popular control of legislation has reached its highest perfection. In two Swiss cantons, the referendum has been in force since the sixteenth century.

Australia and New Zealand, by adopting the principles of the initiative and referendum in

1901, at the time of confederation, gave evidence of advanced political thought. In the home government of Great Britain, these measures have not yet taken root, although the principles of referendum and recall have been practiced there for many years, particularly with respect to the resignation of the Ministry and appeal to the country when a vote showing lack of confidence is recorded in Parliament. While the initiative and referendum have been discussed in Canada, no steps have yet been taken to enact these principles into laws.

The Referendum. In the United States, since the organization of the government, the referendum has been operative to a limited extent on important questions, but has not been known by such name in those matters to which it has been applied. Amendments to the Federal Constitution, when passed by Congress, must be sent to the states for approval through their legislatures; state constitutions, in nearly every instance, after being formulated in the usual constitutional conventions, have received the approval of a majority of the voters of the new state. Questions involving bond issues and other expenditures of large sums of money are first subjects of legislative action, but must have final approval of a majority of the voters within the jurisdiction affected. These are really instances of referendum votes.

The adoption of the referendum in its most modern sense furnishes evidence that the government is yet in a formative period. This measure may be defined as the submission of a state law or city ordinance, which has been passed by the duly organized legislative body, to a vote of the people for final ratification or rejection. The machinery of the law differs considerably in the various states where the measure is in force; for instance, in South Dakota, where in 1898 the first act of the kind was passed, it is provided that the people may require a referendum vote on every act passed by the legislature, and only five per cent of the voters are required in that state to invoke the referendum on any measure. In other states, only specified kinds of laws, such as financial and political measures, are subject to referendum vote, and from ten to twenty-five per cent of the voters must join in petition. The "Oregon Plan," adopted in that state in 1899 and extended in 1904, has been the model for other states in framing laws relating to popular control, including not only the initiative and referendum, but also the recall, direct primaries, popular vote for United States Senators, commission and manager forms of government, publicity of campaign expenses, and corrupt-practices acts.

The Initiative. The success of the referendum naturally invited experiments in the opposite direction. If the people could be

empowered to indorse or condemn a law passed by the legislature or city council, why should not the same power take the first steps toward enacting laws? Frequently lawmakers, for reasons of their own, refuse to reflect the popular will and fail to enact laws the people demand, even though they are elected as the people's representatives. Under such conditions, the initiative is a useful instrument, and by its operation the whole body of voters may become their own lawmakers, in city and state.

Laws governing the initiative naturally vary. They are simplest in operation in cities, because issues are possibly better understood in small areas, the preparatory task is easier, and the number of voters smaller. In a state, however, the measure is fully as successful, even if a little more complicated. A small percentage of the voters of a state, varying from five to twenty-five per cent, may file with the secretary of state, or other designated officer, a petition for a needed law. Then the measure must come before the legislature, without amendment of any kind. If the latter rejects the proposition, in some states such action puts an end to the matter, while in others it serves to bring the question to a vote of the people of the state, over the head of the legislature.

If carried by them, it becomes a statute, for the governor is not permitted to veto a measure so passed. The most advanced initiative measure now in force provides that, when the people petition for a law, the proposal is put up to the people for decision without reference first to the legislature. The latter body, in such instance, has no part in passing or rejecting the measure. The first provision of this kind was embodied in the Oregon constitution in 1902; the second, in Oklahoma in 1907. In a city the procedure is practically the same as in the state: the petition is presented to the city clerk, usually; the lawmaking body is the board of aldermen; the mayor cannot interpose a veto. In some cities, a petition is sent direct to the board of aldermen, who must at once enact the measure into an ordinance or provide for its submission to vote of the people.

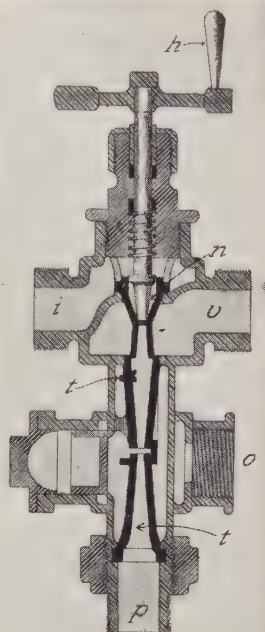
Since they first began to be advocated, initiative and referendum laws have been put in force in more than half of the states. E.D.F.

Related Subjects. Though not directly concerned with the above, the following articles in these volumes reflect other advanced political principles:

City Manager	Primary
Commission Form of Government	Recall

INJECTOR, in *jek' tur*, a mechanical device for supplying additional water to a steam boiler. The injector was invented by a Frenchman named Henri Giffard, and improvements upon his device are now in use on all modern

boilers. It consists of an apparatus by which a jet of steam is brought into contact with a stream of water from a supply pipe. The steam, on cooling, is condensed and imparts to the water a force sufficient to overcome a pressure equal to the pressure of the steam jet. The force thus accumulated drives the water through a pipe, from which it is admitted to the boiler by means of a check valve which prevents back flow or escape of water already in the boiler. The supply of water and steam can be regulated or altogether stopped by means of valves.



INJECTOR

Parts are explained in the text.

Steam is admitted through the inlet *i*, forcing the air out of the tube *u*, creating a vacuum in the water inlet at *v*, and causing water to enter and surround the steam nozzle at *n*. The combined water and steam is forced into the pipe at *p*, whence it enters the boiler, the surplus water and steam finding an outlet at *o*. The steam flow is regulated by the handle *h*.

INJUNCTION, in *junk' shun*, in law, a judicial order requiring a party to do or to abstain from doing some particular act. The writ of injunction was introduced as a remedy for many common-law abuses (see COMMON LAW), and as an equitable remedy, it is one of the most potent. A writ designed to prevent a wrong is known as *preventive*; that which operates to compel the performance of an act is called *mandatory*. In regard to the time when they are granted and the period they are to remain in force, injunctions are classed as *preliminary*, or *interlocutory*, and *perpetual*. The former enjoins temporarily, pending thorough examination into the merits of the case. A perpetual injunction is sometimes issued when, after arguments, the court decides that there are in the preliminary writ valid grounds for its continuance. Common examples of preventive injunctions are those issued to prevent violation of contracts, to

protect patent rights, and to prevent waste. An injunction to compel a person to restore a natural watercourse to the channel from which he had illegally diverted it would be classed as mandatory.

INK. Manuscripts written in ink are in existence which are more than 4,000 years old. They may be seen in museums, with their characters still unfaded. The inks used by the ancients consisted of both pigments and dyes, and Cicero records the fact that the "ink" of the cuttlefish was used in his days as a writing fluid. Colored inks were freely used, particularly for ornamentation, though some of these old manuscripts are written entirely in red, purple, or green.

In modern times, ink is used for both writing and printing. The principal kinds are discussed in the paragraphs below.

Black writing ink is the most common, and the following is a good recipe for its manufacture in small quantities: one pound bruised nutgalls, one gallon boiling water, five and one-third ounces of sulphate of iron (copperas) in solution, three ounces gum arabic previously dissolved, and a few drops of an antiseptic, such as carbolic acid. Steep the galls for twenty-four hours, strain the infusion, and add the other ingredients. Logwood now often takes the place of nutgalls because of its cheapness, but the ink from logwood is a brownish-black. The iron in the copperas acts upon the tannin in the solution of the nutgalls, and on exposure to the air turns this black. Copying inks are prepared by adding sugar, gum, or glycerin to ordinary writing inks. Colored inks are solutions of coloring matter. Red ink is best prepared by dissolving pure carmine in ammonia; blue, by dissolving Prussian blue in oxalic acid; green, by dissolving one per cent methyl green in warm water. More freely flowing ink for fountain pens is made from an aniline dye called *nigrosin*; this ink has a bluish tint, and it never thickens.

Printing ink is made by mixing the best quality of lampblack with boiled linseed oil to which a small quantity of soap and resin has been added. It is thoroughly ground and mixed thicker than paint. There are three qualities of printing ink: newspaper inks, book inks, and lithographic inks. India or China ink is the form in which ink was earliest prepared, and is still used in China and Japan for writing with small brushes instead of pens (see below).

Sympathetic ink is a substance that remains invisible until developed by some means, such as heat or chemical action. Marks made by lemon juice become darkened by heat. Cobalt-nitrate solution turns blue on treatment with oxalic acid. There are many other kinds. Indelible ink used for marking linen is com-

posed of a salt of silver; usually, the nitrate is dissolved in water and ammonia, with a little coloring matter, and with gum added for thickening. To remove ink stains from linen, dip the parts alternately in a weak solution of oxalic acid and hypochlorite of lime (or soda).

India Ink, an absolutely black pigment made of lampblack mixed with glue or gum. It was known and used in China at about 2600 B.C. The best lampblack for this purpose is obtained from oil of sesame. The lampblack and glue are first made into a paste, which is then placed in molds to dry. When required for use as ink, it is mixed with water. It is in great demand for pen-and-ink drawings which are to be photographed and resolved into printing plates, as it is the only known pigment which is really black without a shade of any other color.

INK PLANT. See **POKEWEED**.

INLAND REVENUE. In Great Britain the chief source of income for the support of the government is *inland revenue*, generally known as the excise, or excise duties. The excise in England dates from the Commonwealth, when the heavy expenses made necessary duties of every description. When the Royalists returned to power, however, the duties, instead of decreasing, continued to increase in number and amount. Excise duties from the first were levied on the manufacture of beer, ale, whisky, and similar articles.

Popular feeling against these taxes ran high for many years, the definition of *excise* given in Samuel Johnson's dictionary being an expression of the prevailing sentiment: "A hateful tax levied upon commodities, and adjudged not by the common judges of property but wretches hired by those to whom excise is paid." Since Johnson's day, the excise duties have been greatly lowered, their method of collection has been systematized, and the burden has been equitably distributed. In certain sections the excise is still disliked, but it is recognized as a just means of revenue. There also remain in Great Britain certain excise licenses for the sale and manufacture of liquors, for other trades, such as those of auctioneers, pawnbrokers, etc., hunting licenses, and licenses for carriages, automobiles, and armorial bearings. The administration of these numerous taxes is in the hands of the Commissioners of Inland Revenue.

In most of the British colonies, the excise duties are similar to those of the mother country. In Canada the Dominion government levies a tax on the manufacture of beer, whisky, and tobacco. The collection of the excise is in the hands of the Dominion Department of Inland Revenue. In Australia the excise duties are levied by the Commonwealth, and are administered by the Department of Trade and Customs.

[The corresponding taxation in the United States is called internal revenue (which see).]

INLAY, a kind of decoration of flat surfaces, characterized by the insertion of materials which are different from the ground material, in composition or color. *Marquetry* is the term usually employed for wood inlays, *damascening* being applied to metal inlays, and *mosaic work* to stone (see **MOSAIC**). Marquetry was greatly used in France, Holland, and Germany toward the close of the seventeenth century. Metal inlays of very effective combinations have long been perfected in India.

IN LOCO PARENTIS, in *lo' ko pa ren' tis* (in place of the parent). See **PARENT AND CHILD**.

INNER CITY. See **PEKING, CHINA**.

INNER PLANETS. See **EARTH**, graphic illustration.

INNESS, in' es, GEORGE (1825-1894), an American master of landscape art, one of the greatest painters of natural scenery his country has produced. His maturer art is an expression of his belief that the atmosphere of a picture is more important than the form, and so, though the lines of his landscapes often seem indistinct, in poetic sentiment and in their light and color, they are beautiful. Inness was born in Newburgh, N. Y. His parents recognized his liking for art and gave him what advantages for study the times then afforded, but the boy was too independent and impatient to profit by his instruction. Indeed, it was not until he had studied in France that he began to paint in the style that is characteristic of him; especially was he influenced in great degree by the Barbizon painters (which see).

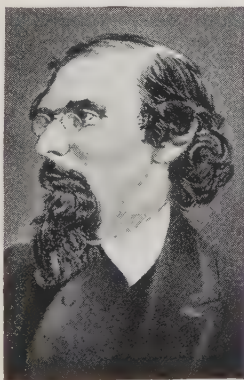


Photo: Brown Bros.

GEORGE INNESS

On returning to America, he opened a studio in Brooklyn, N. Y., then removed to Medfield, Mass. Near the latter city is the charming rural landscape which he reproduced in his well-known *Medfield Meadows*. In 1862 he took up his residence in Eagleswood, N. J., and during the latter years of his life lived in or near New York. Many honors, both at home and abroad, were accorded him. He was made a member of the National Academy and of the Society of American Artists, and his *American Sunset* was selected as a representative work of American art for the Paris Exposition of 1867.

Representative Paintings. An especially fine collection of Inness paintings, to which a room is devoted, is possessed by the Art Institute of Chicago. In this collection are his *Catskill Mountains*, *Millpond*,

Florida Pines, *Threatening*, *Rainbow after a Storm*, and others; the Metropolitan Museum, New York, has a collection of seven, including *Peace and Plenty*, *Delaware Valley*, and *Spring Blossoms*. His well-known *Georgia Pines* and *Niagara* are in the National Gallery at Washington, D. C., and he is represented in other galleries. See page 3456.

George Inness, Jr. (1854-1926), son of the artist whose life is given above, was born in Paris. He studied in Europe, part of the time under the guidance of his father, and between 1895 and 1899, he had a studio in Paris. In 1902 he was made Officier d'Academie des Beaux-Arts. For the last thirty years of his life, he spent his winters in Tarpon Springs, Fla., and died there. Inness presented the town with a little church which he made a shrine of art; there may be seen his masterpiece—*The One Hope*—besides six other paintings. He was a forceful painter of animal life, and his landscapes show much of the quality of color characteristic of his father's work. Among the former are *Monarch of the Farm* and *Surf Horse*; the latter include *The Coming Storm* and *Morning on the River*.

INNOCENT, in' o sent, the name of thirteen Popes, of whom the third had by far the greatest influence. Biographies of the most important are given below:

Innocent I, who was raised to the Papal chair in 402, ruled until his death in 417. He maintained with a firm hand the right of the Roman Bishop to hear appeals from other churches, while his letters were filled with assertions of universal jurisdiction. Two years after he became Pope, he induced Emperor Honorius to pass laws protecting the Catholics against the Donatists, a sect then powerful in North Africa, while some years later he strongly supported Saint Chrysostom, who had been unjustly deprived of the See of Constance. His last years were full of trouble, owing to the damage done by Alaric, leader of the Goths, who pillaged Rome in 410.

Innocent II, who, in spite of much opposition from a faction of cardinals, was elected Pope in 1130, held the second Lateran Council in 1139, which confirmed the condemnations pronounced by several other councils on Abelard (see **ABELARD, PIERRE**) and the followers of Arnold of Brescia, leader of a revolutionary movement in the Church. Until 1138 he had a hard time maintaining his position, although he was supported by Louis VI, the French bishops, and Saint Bernard, for Anacletus II, who had been elected antipope, held possession of the Church of Saint Peter and much of the city of Rome until his death in that year. For the five years following, Innocent II held undisputed sway over the Church. He died in 1143.

Innocent III (1161-1216) was the greatest Pope of this name. His combined wisdom and strength in extending the spiritual power of the Papacy over temporal authority overcame the fears of all who thought him too young for the responsibility, for he was only thirty-seven when elected to the Papal chair. His chief aim was to establish the authority of the Church over the State. He began by restoring Papal authority in Rome, but soon his influence extended over all Europe. He compelled John of England to acknowledge the sovereignty of the Pope and pay an annual tribute; forced Philip Augustus of France to take back his queen, Ingeborg, whom he had tried to repudiate to marry Agnes of Meran; and instituted



"The Path Through the Florida Woods." An example of the art of Inness. See INNESS, page 3455.

the fourth Crusade, which resulted in the capture of Constantinople from the Greeks and the establishment of the Latin Empire (see **CRUSADES**). As a worker for public and private morality, he wielded far-reaching influence, while at his death he was engaged in promoting peace among the Italian cities.

Innocent XI (1611-1689), who became Pope in 1676, was continually involved in conflicts with Louis XIV, in spite of the fact that he owed his election to the French party. The most serious one arose when he tried, unsuccessfully, to put an end to the king's practice of keeping sees vacant and appropriating their revenues. The resistance to this attempt brought forth the celebrated declaration of the French clergy as to the "Gallican liberties." Innocent XI was a vigorous and judicious reformer, censuring many of the propositions of theologians which he considered morally lax.

Innocent XII (1615-1700), upon becoming Pope two years after the death of Innocent XI, followed the reforming plan of his predecessor, who had previously appointed him cardinal. During his pontificate, he brought about a reconciliation with France after the French clergy had retracted the *Four Propositions of the Gallican Clergy*, which asserted that kings in temporal matters were independent of the Pope. G.W.M.

INNOCENTS, FEAST OF HOLY, also called **INNOCENTS' DAY** and **CHILDERMAS**, a festival observed on the twenty-eighth and sometimes on the twenty-ninth of December, in commemoration of Herod's murder of the Bethlehem male children of two years and under (*Matthew* II, 16). The object of the massacre was the destruction of the infant Saviour. In the Roman Catholic Church these children are regarded as martyrs; their murder inspired the exquisitely beautiful hymn of Prudentius, entitled *Salvete Flores Martyrum*.

INNOMINATE, *ih nom' ih nate*, **ARTERY**. See **ABDOMEN**, illustration.

INNOMINATE VEIN. See **BLOOD**, full-page illustration.

INN RIVER. See **SWITZERLAND** (waters).

INNSBRUCK, *inz' brook*, capital of the Austrian Tyrol. See **AUSTRIA** (The Cities).

INNS OF COURT. See **BARRISTER**.

INNUIT, *in' yu it*. See **ESKIMO**.

INOCULATION, *in ok u la' shun*, in medical practice, the introduction of a serum or a virus into the tissues or fluids of the body, for the purpose of preventing certain diseases. Preventive inoculation is illustrated by vaccination to protect from smallpox, and by the injection of toxin-antitoxin to ward off diphtheria. Inoculation for the prevention of smallpox consists in transferring into the skin of a human being the active principle of cowpox, obtained from a sore on an infected cow. The virus thus obtained is known as *vaccine*. The person vaccinated undergoes an attack of this mild disease, and the antibodies manufactured in his blood guard him against an attack of real smallpox.

Inoculation may be accomplished by hypodermic injection, puncture, incision, or scarification. W.A.E.

Related Subjects. For supplementary information the reader is referred to the following articles:

Antitoxin	Serum Therapy
Disease (with list)	Vaccination

INORGANIC CHEMISTRY. See **CHEMISTRY** (Branches).

INQUEST, from a Latin word which means *to inquire* or *to search*, refers to an investigation by a body of men legally constituted to investigate specific matters and make official report thereon. The inquest comes down to us from a very early date; among English people in the British Isles, it was once a body of men impaneled to secure information on any matter of fact; custom, however, has limited the meaning of the term in general, particularly in America and Canada, to what is known as a coroner's inquest. A coroner's inquest is an investigation set on foot by the coroner of a county to inquire into the cause of death of an individual when the cause has not been clearly revealed, or when circumstances point to unlawful acts in connection with the demise. Six men are chosen by the coroner from the people to form the jury; this jury investigates all aspects relating to a death, and makes a written report of its findings to him. The report may later form the basis of grand-jury indictment of suspected persons. Anyone under suspicion may testify on his own behalf at an inquest, waiving immunity. See **CORONER**.

INQUISITION, *in kwih zish' un*, a tribunal in the Roman Catholic Church, known officially as the Holy Office, whose function was the discovery, suppression, and punishment of heresy. From the time of the Emperor Constantine (274-337), the teachings of the Christian Church were regarded as the foundation of law and order, and heresy was therefore deemed an offense against the State as well as against the Church. Constantine's zealous efforts to suppress all forms of unbelief were continued for several centuries by his successors, who cooperated in this work with the bishops.

In the twelfth and thirteenth centuries, the activities of such opposing sects as the Albigenses and Waldenses (see the article **WALDENSES**) aroused the Church to what was deemed a need of increased vigilance, and from the year 1227 the suppression of heresy was entrusted to a permanent tribunal, under the special direction of the Dominican Order. The Inquisition was thereafter a general court instead of a local tribunal, with tremendous powers at its command.

The Inquisition as it developed in Spain met the condemnation of Protestants and Catholics alike. As reorganized under Ferdinand and

Isabella, who used it as a weapon to suppress the conspiracies of the Jews against the government, the Inquisition became a state tribunal controlled entirely by the royal power. Many of the cases that came under its jurisdiction were crimes such as are to-day tried by the civil courts. It was not abolished until 1834.

INSANE ASYLUM. See INSANITY; HOSPITAL.

INSANITY, a general term for various forms of mental disorder. Properly used, insanity is not a medical term, but is a legal concept. In law, the insane are those members of a community who are unable to adjust themselves to ordinary social standards, and have to be placed under special care in order that both they and others may be protected from the effects of their abnormalities. The medical specialist speaks of *psychiatry* rather than insanity, and regards the different forms of insanity as *psychoses* (*si ko' seez*).

Both the causes and the forms of mental disorder are extremely numerous and varied. "Insanity," says one authority, "is a label for a certain form of social maladjustment that may be dependent upon innumerable factors, each one of which, in turn, may be, and probably is, highly complex. In general, the causes may be divided into two general classes—*predisposing* and *exciting*. To the former belong such factors as inherited tendencies, age, sex, environment, and climate. That is, any of these factors may provide the favoring groundwork for a psychosis. The exciting causes, or actual conditions that bring on the disorder, include toxins and infections, exhaustion, body and brain diseases, injuries, and a wide range of mental crises—worry, grief, fright, shock, etc. Actual changes in brain structure may or may not be present, but insanity always indicates some disorder in brain-functioning.

The classification and terminology of mental disorders are constantly shifting, but there is considerable agreement as to the following types of psychoses. The term *paranoid*, or *paranoiac*, is applied to mental states characterized by delusions of persecution and hallucinations of hearing. In mania-depressive psychosis, the principal states are those of mania and depression, the former being manifested by emotional excitement, incessant activity, talkativeness, and great exaltation, and the latter by slowness in thought, speech, and action, and severe depression, or melancholia. These states sometimes recur alternately, with quiet periods between, and in other cases the symptoms of both states are variously combined. *Dementia praecox*—(precocious dementia) is essentially a disease of the young, often beginning at about the age of fifteen. It tends to grow progressively worse, and in the last stages, the victim may

become an imbecile. *Involuntional melancholia* is essentially a mental disease of women in middle life, but attacks men somewhat later. It is characterized by intense depression, in which delusions of sin and self-reproach have a prominent part.

Important among the diseases which cause mental derangement are paresis, hardening of the arteries, chronic alcoholism, epilepsy, and apoplexy (see ARTERIES; ALCOHOL; EPILEPSY).

Paresis is a form of psychosis in which there is change in the brain structure as well as in the mind. It is an after effect of an infection. Beginning with mental disturbance characterized by delusions of grandeur, it ends in great physical weakness and motor and mental paralysis. *Senile dementia* is a form of psychosis which develops in the aged. It is accompanied by the brain and blood-vessel changes of senility. It, too, ends in great mental and physical weakness.

The toxic insanities due to alcoholism and the use of other drugs are apt to disappear as the effect of the drug wears off, but this is not always true.

Modern treatment of the victims of mental disorder recognizes the interrelationship of mind and body. In the best type of hospital (no longer called lunatic asylum), every effort is made to improve the physical condition. Attention to diet, dental and surgical treatment, baths, massage, and all the other applications of modern medical practice have taken the place of cells and straitjackets of former days. In the up-to-date institution for the insane, the emphasis is on curing rather than confining, and so we find such institutions equipped with sewing rooms, schools, shops, and gardens, and in these places the inmates are permitted to benefit by exercise and recreation and by contact with attendants who are enlightened and humane.

The study of the causes and cure of mental disorders has received new impetus from the more recent discoveries in the field of abnormal psychology. It is generally agreed that children of nervous tendencies who grow up in a poor environment and are badly trained may cultivate mental habits that tend to the development of psychoses. The early indications of dementia precox are apt to be a tendency to day-dreaming and an unwillingness to mix with others. Children who tend to substitute dreamy, self-deceptive idealizing and hazy moralizing for wholesome activity need wise and determined guidance, not on occasion, but continuously. See, in this connection, the article MENTAL HANDICAPS.

W.A.E.

INSCRIPTION. See NUMISMATICS.

INSCRIPTION ROCK. See OHIO (Rivers).

INSCRIPTIONS AND BELLES LETTRES, ACADEMY OF. See INSTITUTE OF FRANCE.



INSECT. Scientists tell us that the present period would be the age of insects if man did not dominate the world, and that man and the insect hosts are now engaged in a bitter struggle for supremacy. Some authorities believe that victory, present and future, is with the insect tribe, and that man is doomed to go down to defeat before the numberless small creatures whose domain is earth, air, and water, and whose food is chiefly the food of the human race.

Insects include butterflies, bees, grasshoppers, ants, mosquitoes, flies, beetles, and thousands of other kinds. It is no exaggeration to call them numberless. Scientists have identified and named about 350,000 different species, and there are known to be many others as yet undescribed. Estimates of the total number of insect species run as high as 10,000,000. Moreover, insects multiply at an incredible rate. Though the tragedies in the insect world are so numerous that not as many as one in a hundred lives to complete its normal life cycle, the actual number of individuals always present reaches uncounted millions.

What Is an Insect? That so many different kinds of creatures can be grouped into the one class *Insecta* indicates, of course, that they have certain characteristics that distinguish them from all other animals. Insects form the largest class of the subkingdom *Arthropoda*, which includes every animal having a segmented body and jointed appendages—legs, feelers, mouth parts, etc. Among the arthropods are spiders and scorpions, millipedes and centipedes, mites and ticks, crawfish, crabs, and lobsters, but insects differ from all of these in having the body segments, or rings, grouped into three distinct regions, and in possessing three pairs of legs. Their possession of six legs has given them another class name, *Hexapoda*. The three groups of segments are the head, thorax, and abdomen. Spiders, which are often thought of as insects, have the body divided into two regions, for the head and thorax are united. They, moreover, have four pairs of legs. Mites and ticks, which also are regarded by some as insects, are eight-legged in the adult form, and have no perceptible division between the abdomen and fore part of the body. It is evident that millipedes and centipedes, with their scores of

legs, cannot be insects, though the two classes have some marked points of similarity, including the possession of one pair of feelers, or *antennae*.

All of the arthropods are invertebrate animals, since they lack a bony internal skeleton with a basal spinal column. Insects and the other arthropods have their skeletons on the outside of the body. This *exoskeleton* is a hard crust on the bodies of crabs and lobsters. Among most insects it takes the form of a horny outer layer of the skin, called the *cuticle*. On some insects, as flies and moths, the cuticle is soft and flexible. Beetles and cockroaches are types of those whose body is protected by a thick, firm exoskeleton.

Other Insect Characteristics. While there are wingless forms in nearly every insect group, and parasitic species such as lice, fleas, and others are without organs of flight, the possession of wings is characteristic of insects as a whole. The true flies have but one pair; other winged insects have two pairs. They may be as delicate as thin membranes, or thickened and horny. The wings of moths and butterflies are covered with overlapping scales, which are modified hairs. Both legs and wings of insects are attached to the segments of the thorax; their antennae and mouth parts are appendages of the head. Only the last two or three segments of the abdomen ever bear appendages, and these are always specialized organs, such as the stings of wasps and bees, and the egg-laying tube of the female insect.

Internal Structure. Within the small body cavity of an insect lie well-developed organs that make up its digestive, circulatory, respiratory, and nervous systems. When one considers that the average length of insects is a fraction of an inch, it is easy to see why the microscope is needed for a close study of their internal structure. The student, however, may gain a very adequate conception of the vital organs by dissecting a large caterpillar, the young of a moth or butterfly. Although the internal organs undergo change during the development from young to adult, the essential facts of internal structure apply to both forms.

Digestive System. Beginning at the mouth, and extending to the end of the abdomen, is a digestive tube, or alimentary canal. It con-

sists of a food tube, or oesophagus; a stomach, which is variously modified according to food habits; intestines; and rectum. Threadlike ducts located at the junction of the stomach and small intestine remove waste matter from the blood. These minute "kidneys" are called *Malpighian tubules*. There are salivary glands in the mouth, and others in the stomach that are supposed to secrete digestive fluids.

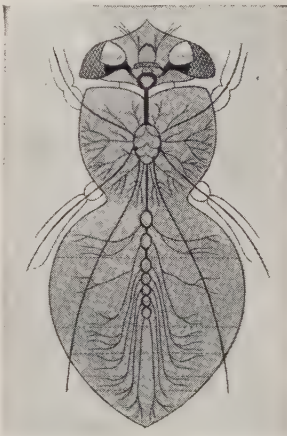
Circulation. In vertebrate animals the blood has an essential part in the process of supplying the tissues with oxygen and of excreting carbon dioxide. In insects this process is a function of the breathing organs (see below). Hence the circulatory system of insects is comparatively simple. There are no arteries or veins. The "blood," which is a yellowish-white or greenish mixture of blood and lymph, is forced through a pulsating tube extending through the thorax and abdomen along the inner surface of the back. This so-called "heart" consists of a series of chambers one above the other, in the sides of which are small openings controlled by valves. The blood, laden with nourishment, enters the tube through these openings and is pumped through the chambers by alternate contractions and relaxations of muscles in the tube walls. After being forced out through a narrowed portion at the top, called the *aorta*, it flows through the body, carrying nourishment to all the tissues. Having given up its supply of nutriment, it receives new stores by bathing the walls of the digestive canal, and again makes its journey through the pulsating tube.

Respiration. An insect does not breathe through its mouth, nor has it lungs. Air is drawn into its body through two rows of small openings called *spiracles*, located on opposite sides of the thorax and abdomen. Leading from these holes are air tubes, or *tracheae*, that divide and subdivide throughout the body. The tracheae are channels through which oxygen is carried to the tissues. Through them, too, carbon dioxide is carried out of the body. When an insect breathes, it alternately contracts and expands certain muscles in the wall of the abdomen. The contracting abdomen presses upon the vital organs, and these upon the tracheae, which collapse and squeeze out the carbon dioxide, which is a waste product of digestion and assimilation. When the abdominal muscles relax, fresh air flows through the spiracles and fills the air tubes, which expand, as they have contracted, by reason of the elasticity of their own muscles. Except for a few species that breathe through

the skin, all insects respire by means of air tubes and spiracles. In the case of water-inhabiting species, tracheal gills may be a part of the respiratory equipment.

The spiracles have grates of stiff hair to keep out the dust. An insect may be asphyxiated by coming in contact with something greasy or oily, if a film of oil spreads over its spiracles. This fact is made use of in the campaign against mosquitoes (see *MOSQUITOES*). Contact insecticides are effective in killing insects because they reach the body tissues through the openings.

Nervous System. The central nervous system of insects consists of a nerve trunk, enlarged at intervals with knots of tissue, or *ganglia*; and connecting nerve cords. The trunk is a delicate white cord extending through the center of the under side of the body. In the insect's head there is a large ganglion lying above the oesophagus. It is connected by nerve threads with a smaller ganglion beneath the oesophagus. Nerves lead from the upper ganglion to the eyes and antennae, and other nerves from the lower knot connect with the mouth parts. Other ganglia in the thorax and abdomen have nerve connections with the legs, wings, muscles, vital organs, and other parts of the body. In the more highly organized insects, the ganglia tend to unite and form larger and fewer centers of control. In the more primitive forms, there are nearly as many knots as

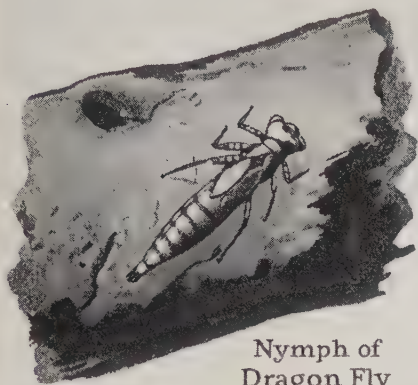


NERVOUS SYSTEM OF AN INSECT

there are segments. Because of the location of the upper head ganglion, it is called the insect's brain, but each of the ganglia is a "brain" for its particular region. Many insects also possess ganglia and nerve cords constituting a sympathetic nervous system.

Special Senses. Insects have the five senses possessed by man, and possibly others of which man does not know the nature. Smell seems to be the sense upon which they chiefly rely, and their mechanism for the detection of odor is marvelous indeed. It consists of numerous minute pits and cone-shaped projections, or *papillae*, located principally on the antennae, but possibly to some extent on the mouth parts. These organs are so constructed that the nerve end in each can come in contact with the substance to be identified, without being injured by other objects. There are nearly 40,000 pits on each of the two antennae of the June beetle. Not only do insects find their food by the sense of smell, but they recognize one another by this sense, and the male is directed by this means to the female. The

In the WORLD of INSECTS

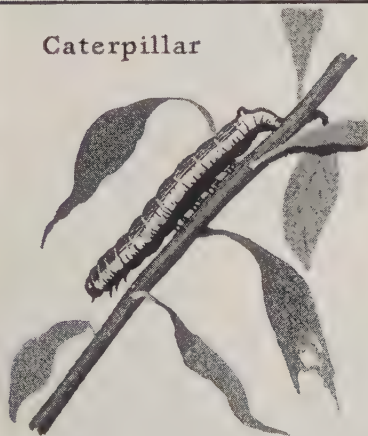


Nymph of
Dragon Fly



Dragon
Fly

Caterpillar



Pupa

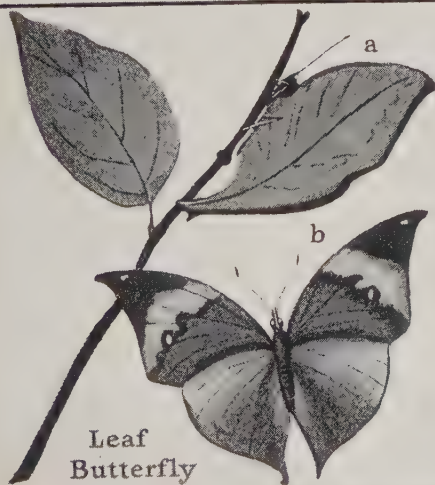
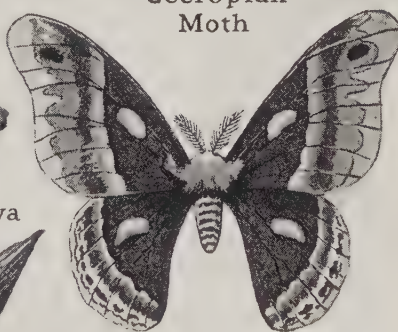


Larva



Cocoon

Cecropian
Moth



Leaf
Butterfly



Grasshoppers
of Mexico

sense of taste, which is also acute, is seated in pits or papillae located on the mouth parts. Before they can experience the pleasure of taste, insects have to dissolve the food substances in their mouth fluids.

Delicate hairs, connected with the nerve ganglia, and located on the antennae and over the body generally, are the chief organs of touch. For vision, most insects possess two kinds of optical organs. These are three inconspicuous simple eyes, or *ocelli*, located on top of the head, and a pair of large *compound* eyes, the outer surface of each being divided into tiny six-sided facets. These facets range in number from less than a score to 30,000. Each facet has its own nerve and lens apparatus, but all of the miniature eyes are defective in regard to focusing. An insect, in fact, has very limited vision from the human standpoint. The simple eyes can see objects not farther off than a few inches, and only in a shadowy way. Each of the facets of the compound eyes perceives a microscopic image directly in the line of vision, and the combination of numerous tiny images makes the picture for the insect. This mosaic pattern is seen with varying distinctness, according to the number of facets. The range of vision for compound eyes averages two or three yards, but may be more in special cases. In general, the visual mechanism of insects is adapted to the perception of objects in motion and to the detection of color, rather than to the recognition of clearcut images. Some insects have but one kind of visual organ, and others are wholly lacking in eyes of any kind.

There is no special type of auditory organ common to all insects. The "ear" of locusts, katydids, and crickets is a small, thin drum membrane with a liquid-filled sac and appropriate nerve connections. Locusts have their hearing organs on the abdomen, and katydids and crickets have them on the forelegs. Many other insects have the sense of hearing localized in fine hairs associated with a delicate receiving mechanism of rods, nerves, and ganglia, the whole apparatus being found on the antennae. The most highly specialized organ of this type is the male mosquito's auditory apparatus, which he probably uses in finding his mate.

Habits and Instincts. Among a group so numerous as the Insecta, extreme diversity of habit is to be expected, and this diversity is especially noticeable in their food habits. Insects suck the blood of human beings and of animals, and the sap of plants. They sip flower nectar and they lap syrup. They bite and chew an infinite variety of solid substances, including plant stems, seeds, wood, paper, cloth, fur, feathers, carrion, and the bodies of their own kind. To correspond with these habits, we find great variation in mouth parts—the sucking tube and the piercing beak, the

lapping tongue and the biting jaw, with numerous modifications of these.

In their domestic life, many insects show such ingenuity and intelligence that naturalists have wondered whether something more than instinct guides them. Some insects build their nests and care for their young as individuals, while others, such as the ants, honeybees, and social wasps, live in communal nests and uphold a rigid caste system of males, queens, and workers. Among the nest-making insects we find masons, potters, miners, carpenters, paper-makers, and mound builders. In the articles listed at the close of this discussion the reader will find more detailed information about the wonderful adaptations of the insect tribe, their modes of living, and their struggle for existence.

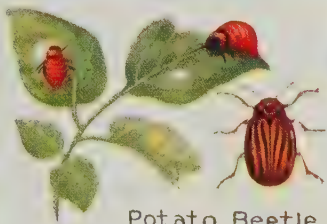
The Developing Insect. All insects begin life in the egg, and most of them are hatched from eggs deposited outside the mother's body. A striking fact about many insects is that the young bear no resemblance to the parents, but pass through radical changes in completing their life history. Such development, called *complete metamorphosis*, is admirably illustrated in the life cycle of moths and butterflies. The young hatches from the egg as a wormlike creature, the familiar caterpillar, and is called the *larva*. After devoting its entire time to eating, it enters the third, or *pupa*, stage. In this form it is dormant in so far as eating and motion are concerned, but is none the less being prepared for its existence as a mature insect. Moth caterpillars often pass the pupal stage in silken cocoons. Butterfly caterpillars lie encased in hard skins, and are known as *chrysalides*. The adult winged insect is called the *imago*. Other insect groups with complete metamorphosis include the beetles, true flies, ants, bees, and wasps.

Locusts, katydids, crickets, and various other insects exemplify in their development what is called *incomplete metamorphosis*. In these forms, the newly hatched young greatly resemble the parents in appearance, except that wings are lacking. The young are called *nymphs*. A few insect species, chiefly those of very simple organization, pass through no metamorphosis; the young resemble the parents in practically all points except size and maturity of reproductive glands. One of the most interesting examples of instinct among the Insecta is the ingenuity displayed by the mothers in seeking places to lay their eggs. In each case the young hatches in the location best suited to supplying it with the food it requires.

Insects as Enemies of Man. The estimated money loss caused every year by insect depredations on the field, garden, and orchard crops of America is equal to an annual tax of nearly \$20 for every man, woman, and child in the country. Most of the insect pests that damage

PART of the ARMY of INVASION

FARMERS LOSE A BILLION DOLLARS EVERY YEAR FROM THEIR DEPREDATIONS



Potato Beetle
Natural Size



Grasshopper
1/2 Natural Size



Codling Moth
Natural Size



Chinch Bug
Natural Size 1/8 Inch



Cabbage Butterfly and Larva
1/2 Natural Size



Cotton-boll Weevil
Natural Size 1/4 Inch



Wheat-head Army-worm
1/2 Natural Size



Corn Ear-worm
1/2 Natural Size



Striped Cucumber Beetle
Natural Size



Black Swallow-tail Butterfly and Larva



Asparagus Beetle
Natural Size 1/4 Inch

American crops are of foreign origin. In their native lands, such insects are preyed upon by their natural enemies; in their new homes, they make rapid headway from the beginning because there is no natural check to keep down their numbers, and when man discovers them, they are beyond easy control. The cotton-boll weevil, potato beetle, and Mexican bean beetle, all of them responsible for untold damage, reached the United States from Mexico. From Europe came the corn borer, the gypsy and brown-tail moths, and the Hessian fly. The Japanese beetle and Oriental peach moth came from the Orient. Sometimes native insects, formerly harmless, become injurious pests as a result of the importation of crop plants that prove to be better food for them than the plants hitherto eaten.

Both the Federal and state governments employ trained men whose business it is to learn how to check insect pests and to teach crop-growers their discoveries. The effectiveness of a campaign against any pest is in proportion to the farmer's knowledge of its life history, habits, and body structure. When it is known that the insect or its larva or pupa spends the winter in crop remnants or rubbish, clean-up methods are necessary; if the soil harbors these pests through the winter, the field must be plowed and disked in the fall. Sometimes rotation of crops will rid a field of a plague of insects by depriving them of their preferred food. These and other farming methods, the use of poison dusts and sprays, and the introduction of parasites to prey upon the pests are some of the measures being successfully employed. Credit, too, should be given to birds and other natural enemies of the insect hosts. Yet these enemies of our crops continue to increase, and are a perpetual challenge to man to save his race from starvation through the destruction of his food supplies.

Insects and Disease. Besides causing serious losses to agriculture, insects are concerned in the spread of many diseases, both of man and domestic animals, and of cultivated plants. Mosquitoes carry in their bodies the germs of malaria and yellow fever, and the parasite that causes that hideous tropical disease, elephantiasis. These diseases are transmitted to man by the bites of the insects. In a similar manner, fleas transmit bubonic plague, and lice spread typhus fever. In Africa the deadly sleeping sickness of man and nagana of cattle are transmitted by tsetse flies. Perhaps a worse pest than any of the foregoing is the common house fly, which spreads typhoid fever and other infections not by acting as the host of the germs, but by carrying the organisms on its body and transferring them to food and drink.

Horses, cattle, and other domestic animals are tormented by the bites of various kinds

of flies, and the larvae of some of these find entrance into the bodies of the animals, causing serious disorders of the parts attacked. See, in this connection, the article **PARASITE**; also **ZOOLOGY** (How Zoölogy Affects Human Welfare).

Insects as Friends. Though we usually think of them as our enemies, insects are in many ways very useful to man, and it is said that without them the earth would soon become uninhabitable. If we did not have the bees and other insects which carry the pollen of flowers, we should have almost no fruit. Some of our most beautiful flowers depend on insects which carry the pollen from one blossom to the blossom of another, so that good seed may set. Some insects also act as scavengers, because they feed on dead and decaying animal and vegetable matter. Honey, silk, and beeswax are made by insects, and also a less-known but valuable product called lac, from which lacquer and shellac are derived. But the greatest good done by insects is effected by those parasitic kinds that keep the destructive kinds in check. The problem is to destroy as many of the vicious kinds as possible, and to encourage the friendly species.

Classification. Insects have a much more ancient lineage than the mammals. In the Carboniferous (coal-making) Period there were insects with a wing spread of two feet. Gigantic reptiles, the mammoth, and other species have passed out of the story, but insects have not only survived but have increased in number, though not in size. They are found in practically every part of the globe except the ocean. In the eighteenth century, Karl von Linné (Linnaeus) divided the great insect host into seven orders, according to the character of their wings. Modern authorities use this classification as a basis, but divide the insects into a greater number of orders (see below), according to similarities of structure and habit. The system here given is the one generally followed in schools. The names adopted by Linnaeus have been retained. Note that most of the names end in *-ptera*, the Greek word for *wings*. In the list of orders, we begin with the simplest and proceed to the group of highest intelligence, as follows:

1. **Aptera** (wingless) are primitive insects, including the springtails, seen in large numbers on the surface of pools.
2. **Euplexoptera** (wings well folded) are the earwigs, recognized by forceps-like appendages on the tip of the abdomen.
3. **Orthoptera** (straight-winged) include the cockroaches, crickets, locusts, grasshoppers, the katydids, and the walking sticks.
4. **Ephemera** (lasting-a-day) are the May flies, familiar to people who live on lakes or rivers.
5. **Odonata** (of uncertain meaning, from the word for tooth) include the dragon flies, or "devil's darning

needles," which destroy vast numbers of mosquitoes.

6. **Plecoptera** (plait-winged) are the stone flies, whose *nymphs*, or young, are found on the under side of stones in brooks.

7. **Isoptera** (equal-winged) are the white ants, or termites, which in Africa and South America build huge mounds and eat the timbers of houses.

8. **Mallophaga** (hair-eating) are the bird lice. They do not suck, like the *Hemiptera* lice, but bite off bits of feathers.

9. **Corrodentia** (gnawing) include book lice.

10. **Neuroptera** (nerve-winged) contain the ant lions, which dig pits into which their prey, the ants, fall.

11. **Mecoptera** (long-winged) include small, wingless, shiny black insects which leap in the snow, and the scorpion flies.

12. **Trichoptera** (hair-winged) are the caddis flies, which build houses of sand, pebbles, or wood in streams and ponds.

13. **Coleoptera** (sheath-winged) are the beetles. The forewings are leathery and veinless. The hind wings are broad and membranous and fold up under the forewings when the beetle is at rest.

14. **Thysanoptera** (tassel-winged) are thrips, very small insects living on flowers and vegetables.

15. **Hemiptera** (half-winged) are sucking bugs, among which are the chinch bugs, scale insects, plant lice, "kissing bugs," and the large water bugs that fly about arc lights. Their mouths are specially formed for sucking juice or blood.

16. **Lepidoptera** (scaly-winged) are best known to us as butterflies and moths. The silkworm is a larva of a moth now domesticated. This moth and the honeybee are the only domesticated insects.

17. **Diptera** (two-winged) are the true flies: mosquitoes, house flies, horse flies, botflies, and others.

18. **Siphonaptera** (tubed, wingless) are fleas.

19. **Hymenoptera** (membrane-winged) embrace bees, ants, wasps, and gallflies. All the *social insects* except the termites are included in this division. W.J.S.

Related Subjects. The reader is referred to the following articles for descriptions of specific insects, and for supplementary information:

KINDS

Ant	Army Worm
Ant Lion	Bean Beetle
Aphides	Bedbug

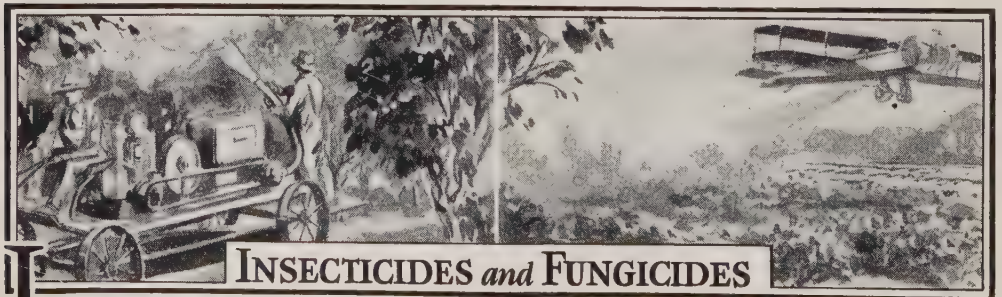
Bee	Horse Fly
Beetle	Ichneumon Fly
Blowfly	June Bug
Boll Weevil	Katydid
Bookworm	Lace-Winged Flies
Botfly	Ladybird
Brown-Tail Moth	Leaf Insect
Bug	Locust
Butterfly	Louse
Cankerworm	Mantis
Carpet Beetle	May Fly
Chinch Bug	Measuring Worm
Cicada	Mole Cricket
Click Beetle	Mosquito
Cockroach	Moth
Codling Moth	Phylloxera
Corn Borer	Pink Bollworm
Corn Earworm	Potato Bug
Cricket	Rose-Chafer
Curculio	San José Scale
Cutworm	Scale Insect
Death's-Head Moth	Scarab
Deathwatch	Scorpion Fly
Dragon Fly	Stag Beetle
Earwig	Tent Caterpillar
Firefly	Termites
Flea	Tsetse Fly
Fly	Tussock Moth
Gnat	Walking Stick
Grain Weevils	Wasp
Grasshopper	Water Beetle
Gypsy Moth	Water Bug
Hawk Moth	Weevil
Hercules Beetle	Wireworm
Hessian Fly	Yellow Jacket
Hornet	

GENERAL TOPICS

Antennae	Insecticides and Fungicides
Beetle	Larva
Bug	Lepidoptera
Caterpillar	Metamorphosis
Chrysalis	Neuroptera
Cocoon	Orthoptera
Diptera	Pupa
Hemiptera	Silk
Honey	Zoölogy (Divisions of the Animal World)
Hymenoptera	

INSECTA, in *sek' tah*, a class of arthropods. See **INSECT**.

INSECTICIDE AND FUNGICIDE BOARD, in *sek' ti side, fun' ji side*. See **AGRICULTURE**, UNITED STATES DEPARTMENT OF.



INSECTICIDES AND FUNGICIDES. These terms, which appear rather technical, mean, literally, *insect-killers* and *fungus-killers*. The farmer and the gardener must be thoroughly acquainted with them if control or ex-

termination is to be accomplished. For at every stage in their operations, whether it be the young plant, the blossom, the maturing fruit, or the seed that they are watching, there are insect and fungus pests ready to destroy—

to make care and labor of no avail. Sometimes the same preparation is effective against both kinds of pests, but there are some which are effective for one and not for the other.

Insecticides

Insecticides are generally classified as poisons for biting insects, contact substances for sucking insects, and gases for both sucking and biting insects. Paris green, arsenate of lead, calcium arsenate, and hellebore are the poisons in general use for those insects that chew and swallow parts of the plant, while dilutions of nicotine, soap, and various oils are the chief contact insecticides. Carbon bisulphide and hydrocyanic-acid gas are the most important fumigants. These are briefly discussed.

Paris Green. This green insecticide is made by combining white arsenic, copper oxide, and acetic acid. It usually contains about fifty-eight per cent arsenious oxide. For many years it was used against the potato beetle, and in combination with Bordeaux mixture as a spray for fruit trees. Paris green has a tendency to burn tender foliage, and fruit-growers use arsenate of lead, though many of the poison preparations contain Paris green. For spraying apple trees and potato foliage, use Paris green one pound, quicklime two pounds, and 100 gallons of water.

Arsenate of Lead. This may be obtained in paste or powdered form. It is a fine white amorphous (uncrystallized) powder that usually contains thirty per cent arsenic oxide. Arsenate of lead is superior to Paris green, because it remains in suspension in water longer, adheres well to the foliage, and is less liable to burn the foliage of plants. The powdered lead arsenate can be mixed with hydrated lime and dusted on the foliage, or used as a spray, in the proportion of one pound of poison to fifty gallons of water. In spraying apples, pears, and grapes, it is customary to combine the poison with a fungicide such as Bordeaux mixture.

Calcium Arsenate. This is a cheaper form of poison than arsenate of lead. In the powdered form it usually contains forty-two to forty-six per cent arsenic oxide. Calcium arsenate is unsafe to apply to the tender foliage, and usually causes injury to apple foliage. It is now extensively used to dust cotton for the boll weevil, and bean plants for the Mexican bean beetle. It is also employed in the control of the potato beetle. The poison is dusted directly on cotton, usually three to five applications being made. For the bean beetle, use one pound of poison to seven pounds of hydrated lime.

Hellebore. The powdered roots of the white hellebore plant are often used as an insecticide in the place of arsenicals. Hellebore is usually

applied dry, either pure or mixed with flour or lime, at the rate of one pound of hellebore to five pounds of either lime or flour. There are two plants which are commonly called hellebore. These are *Veratrum album*, and *V. viride*. The former is a native of Europe and is largely imported.

Poison Bait. It is possible to destroy grasshoppers, cutworms, and army worms by the use of poison baits. For grasshoppers, use twenty pounds of bran, one pound of Paris green, two quarts of syrup, three oranges or lemons, and three and one-half gallons of water. The bran and poison are mixed dry. The juice of the fruits and the skins chopped fine are added to the water and syrup. The poisoned bran is then thoroughly mixed with the sweetened water. The material may be sown broadcast, at the rate of five pounds to the acre. If the bait is to be used for cutworms, it should be distributed late in the afternoon; one should be careful to place it close to the plants to be protected.

Nicotine. This is used to control sucking insects, such as aphides. A strong decoction of tobacco stems is made by steeping stems or refuse tobacco in water for several hours, using one pound of stems to one gallon of water. Fruit-growers and truckers use commercial preparations of nicotine sulphate containing forty per cent nicotine. As a spray for aphides, this is diluted with water or other spray mixtures in the proportion of one part of nicotine sulphate to 800 parts of water. The nicotine dust is also widely used. This is prepared by mixing the nicotine with hydrated lime. A five per cent nicotine dust is used to kill the adult cucumber beetles, and a three per cent dust against aphides. Nicotine preparations can be used on tender plants without danger of injury to the foliage.

Whale-Oil Soap, or laundry soap, dissolved in warm water at the rate of two pounds to the gallon, makes an excellent early spring treatment for fruit trees before the buds swell. It is also valuable as a summer spray against aphides, when diluted in the proportion of soap one pound and water six gallons. House plants, such as palms and rubber plants, may be protected by an occasional treatment with the weak soap solutions.

Oil Emulsion. Oil emulsions are widely used by fruit-growers for the treatment during the dormant season of apples and many other fruits, for the control of scale insects. Oil emulsion may be purchased ready for use or prepared as follows:

Potash fish-oil soap.....	2 pounds.
Paraffin oil.....	2 gallons.
Water (soft).....	1 gallon.

The water, oil, and soap should be brought to a boil, then removed from the fire and

churned or pumped under pressure until the emulsion is formed. For use during the dormant season against the San José scale, the emulsion should be diluted to contain three per cent oil.

Lime-Sulphur Solution. This is employed as a dormant spray for the control of scale, and also during the summer as a fungicide. The stock solution can be prepared by the fruit-grower; for a long time the lime-sulphur cooking plant was a part of the equipment of every fruit farm. Now, most growers purchase the concentrated solution testing 32° Baumé. This solution is diluted in the proportion of one to eight parts of water for a winter spray, and one to forty for use on the foliage.

Sodium Fluoride. This insecticide has come into use during recent years for the control of chicken lice, roaches, and ants. To destroy ants and roaches, it is only necessary to dust the poison on the floor. Sodium fluoride is a white powder poisonous to human beings, and care should be exercised to keep the package carefully labeled.

Carbon Bisulphide, a colorless liquid about one-fourth heavier than water. It evaporates readily, is highly inflammable and explosive, and consequently should not be used near a fire of any kind. Carbon bisulphide is extensively used against insects affecting stored grain. It may be placed in shallow pans on top of the grain, or thrown directly on the grain, without injury to the germination or milling properties. In tight bins, use four pounds to each 100 bushels, and let the fumigation continue for twenty-four hours. To be effective, the temperature should not be lower than 60° F.

Hydrocyanic-acid gas is liberated when sulphuric acid is added to potassium or sodium cyanide. It is a deadly poisonous gas that first came into use in California for the fumigation of citrus trees. Later, it was introduced into the East for the treatment of dormant nursery stock, and for the control of flour-mill, greenhouse, and household pests. This gas is lighter than air, it diffuses rapidly, and does not tarnish metal or injure seeds or dry food products. Owing to the rapidity with which gas is generated when the chemicals are combined, and owing to its poisonous nature, it is not advisable to use it except with the assistance of an experienced operator. There is now available, however, calcium cyanide, which is equally effective for household use. This chemical absorbs moisture, after which the gas is evolved. It is only necessary to scatter the dust on the floor and close the room for ten or more hours.

Paradichlorobenzene. This is a new fumigant that is now generally used for the destruction of peach-borers. It is a colorless, crystalline substance that volatilizes slowly.

The vapor is more than five times heavier than air. For the fumigation of peach trees, clean the grass from about the trunk, place a half ounce or more of the crystals in the form of a ring about the tree, and cover with several inches of earth. The dirt should be removed two to three weeks later. The treatment should be applied in spring or fall. The chemical may also be used to protect clothes from the clothes moths and other pests. W.J.S.

Fungicides

Fungicides, like the insecticides, are sprayed upon growing plants, but the spray must be finer, so that no drops remain upon the leaves. Some are especially adapted to the preservation of seeds or of fruit.

Bordeaux Mixture, the best fungicide for general purposes, is made as follows: In a wooden vessel dissolve five pounds of copper sulphate (blue vitriol) in five gallons of water. This can best be done by suspending the sulphate in a coarse cotton bag in the water. To neutralize the corrosive power of the vitriol, add a solution formed by slaking five pounds of fresh lime in five gallons of water. Pour this compound into fifty gallons of water and mix violently. This solution is known as the five-five-fifty, from its proportions. If plants with very young leaves, or such delicate trees as the peach and the plum, are to be sprayed with this mixture, twenty-five gallons more of water and an extra pound of lime should be added.

Copper-Sulphate Solution. This is a valuable mixture in which to soak the seeds of barley, oats, or wheat that are in danger of fungus affection. It must not be used as a spray, as it has a corrosive effect on the foliage. To make it, simply dissolve one pound of copper sulphate in two gallons of water.

Copper-Carbonate Solution. Some sprays, including the Bordeaux mixture, will discolor, and so may not be used on fruits, or on foliage that must be kept green. The solution formed by adding to ten gallons of water an ounce of copper carbonate dissolved in a pint of ammonia has no such fault.

Sulphur. This simple fungicide is very useful in the hothouse. It is sprinkled freely on the steam pipes, or on some other surface warm enough to vaporize it, and is usually effective in killing off all fungi. The greatest care must be taken, however, not to set fire to the sulphur, as growing plants are quickly killed by sulphur fumes.

INSECTIVORA, in *sek tiv' o rah*, from two Latin words, *insectum*, meaning *insect*, and *vorare*, meaning to *devour*, is the name applied to an inferior order of small, timid mammals, which prowl at night and feed chiefly on insects. Their teeth are tipped with small projections, by means of which they can easily break the hard, outer insect shell. The legs of

Insectivora are short, and the animals walk with their feet flat on the ground. L.H.

Related Subjects. The following members of the order are described in these volumes:

Hedgehog Mole Shrew

INSIGNIA, in *sig' nih ah*. See UNIFORMS AND INSIGNIA.

INSOLVENCY, in *sol' ven sie*. See BANKRUPT; RECEIVER.

INSOMNIA, OR **SLEEPLESSNESS**, inability to sleep naturally. A good deal of misinformation about the cause and effects of this common ailment has been dispelled by modern research concerning the purpose and nature of sleep. The older theory assumed that we sleep to get rid of poisonous substances produced in the blood by the activities of the day, and that during sleep these chemicals are oxidized. The modern theory gives to sleep a protective rôle. We sleep in order that the body may be kept from exhaustion by ceaseless activity; that the nervous organism may be protected from unlimited loss of energy, and have opportunity to recuperate. Of course the repair of tissues goes on more rapidly during sleep than while we are active, because all the body functions and processes are slowed down in sleep. In the daytime, repair and building-up cannot keep pace with wear and tear, and so the body and mind must have periods of rest.

The chief difficulty in cases of ordinary insomnia, those not due to actual disease or severe pain, is that people have become imbued with the idea that a specified amount of sleep is of the greatest importance. Hence, when they lie awake, unable to sleep, they worry themselves into a state of nervous exhaustion. The effects of fear and worry, physicians say, are more harmful than the effects of insomnia itself. Without underrating the value of sleep, they stress the beneficent effects of rest, declaring that complete relaxation of muscles and passivity of mind will give the victim a substitute for the sleep he vainly seeks.

Once convinced that he need not worry over his inability to sleep, the victim has won half the battle. Worry and fear hold the mind in a tension. When the sleepless one can say to himself, "I shall rest by lying quietly here in the dark, and it makes no difference whether I sleep or not," in most instances he will fall asleep because he does not try to. The best way to entice natural sleep when it seems to elude one is to stop all voluntary movements (which send stimuli to the brain), shut out stimuli perceived visually, by closing the eyes, and allow the mind to be utterly passive. In other words, refrain from tossing and turning, and let the thoughts drift, dismissing anxieties, cares, and worries of every kind.

A monotonous ticking of a clock, the murmur of wind in the trees, the swish of waves on a shore, and similar recurring sounds help some to fall asleep. Relaxation and monotony are probably the chief factors in producing the sleeping state. Coffee and other stimulants, excitement, and gayety tend to irritate the nerves of many people, and when indulged in late at night, they become factors in producing insomnia. Then there are various physical conditions that are sleep-disturbing, such as indigestion, lack of ventilation, cold, heat, loud noises, an uncomfortable bed, etc. These conditions are often under one's control. There is no reason, therefore, why most people in average health cannot enjoy all the restful sleep they require.

Insomnia resulting from diseases or from severe and prolonged pain requires the attention of a physician. He alone is qualified to say whether a sedative is justified. The taking of sleep-producing drugs without medical advice is extremely hazardous and should be avoided by everyone. W.A.E.

Insomnophobia is a morbid fear of insomnia, or worry and anxiety about it. An *insomniac* is one who becomes frenzied, excited, or angered about his sleeplessness, or the causes which contribute to it.

Related Subjects. The reader is referred in these volumes to the following articles:

Fatigue Sedative
Nightmare Sleep

INSPIRATION. See BREATH AND BREATHING (Acts of Breathing).

INSTALLMENTS, PURCHASES BY. See CREDIT (Purchase on Deferred Payments).

INSTEP. See FOOT.

INSTINCT, in animals, including man, is the power which enables an individual to perform an act without previous experience or observation of the act or its effects. Instinct causes a chick to scratch the ground, a bird to build its nest, a wasp to feed its larvae (young), or a baby to cry. The word is not exactly defined, for psychologists and biologists hold differing opinions regarding it. In general, however, scientists distinguish instinct from unconscious reflex action (see REFLEX ACTION), such as is produced in the lowest animal forms by changes of temperature; and from intelligence, which includes the ability to profit by experience, and implies the capacity of dealing with ideas as well as objects.

An act is instinctive, speaking generally, only the first time it is performed. Afterward, experience is to some extent a factor in prompting the act and in altering the method of performing. Thus, intelligent behavior is characteristic of the individual, instinctive behavior of the species. Each spider weaves its web much as any other of the same species, the similarities being due to instinct, the differences to individual experience. Sometimes, there-

fore, instinct induces an action which intelligence would condemn. We have all seen a startled rabbit "freeze" and remain motionless until it thinks all danger is past. This it does by instinct, for, as a rule, rabbits attract less attention when still. But in individual cases, the rabbit may be endangered instead of protected by obeying this instinct, as, for example, when a white rabbit stops in front of a dark background.

Truly instinctive acts are observed in the insects which live but one season. The *solitary* wasp, before sealing the cell in which it has laid an egg, puts in food for the larva. It then deserts the cell; the wasp which originates in the egg will certainly not be profiting by experience or observation when it repeats the process in the next generation. The solitary wasp, too, builds a hexagonal cell, just as do social wasps and honeybees. A round cell would appear to serve the purpose, but instinct preserves the hexagonal form. See *WASP*; *ANIMAL* (Animal Intelligence and Senses).

C.E.S.

INSTITUTE OF FRANCE, the name given to a group of learned societies united into one body under the patronage of the French government. Each has its special functions in fostering some branch of literature, art, science, or philosophy. In its present organization, the Institute embraces five academies:

(1) The French Academy, organized by Richelieu in 1635, devoted to the French language and to criticism of literary works. Its members are often called the *Forty Immortals*. The public has in fancy created a "forty-first chair," in which Molière, Rousseau, Dumas, Balzac, Daudet, Maupassant, and Zola have been seated. To be elected a member of the French Academy is one of the highest literary honors France can bestow.

(2) The Academy of Inscriptions and Belles Lettres, nicknamed the "little Academy," founded in 1603, devoted to the study of antiquities, inscriptions, and ancient and Oriental languages.

(3) The Academy of Sciences, founded in 1666, for the promotion of mathematics, physics, astronomy—in fact, the entire scientific field.

(4) The Academy of Fine Arts, founded in 1648, devoted to music, painting, sculpture, and architecture. It has brought to public notice many valuable art works and sponsored most of the noted painters of France in their student days.

(5) The Academy of Moral and Political Science, founded in 1795, suppressed in 1803, but restored in 1832, given to the discussion of philosophy, psychology, history, finance, law, and political economy.

The Institute of France gives over \$20,000 annually in prizes for the best work accomplished in its various departments. The members receive a small salary. Each academy has its own officers and funds, although the collections and libraries are held in common. The general fund is in charge of a committee of two from each academy, which acts with the Minister of Public Education, its chairman.

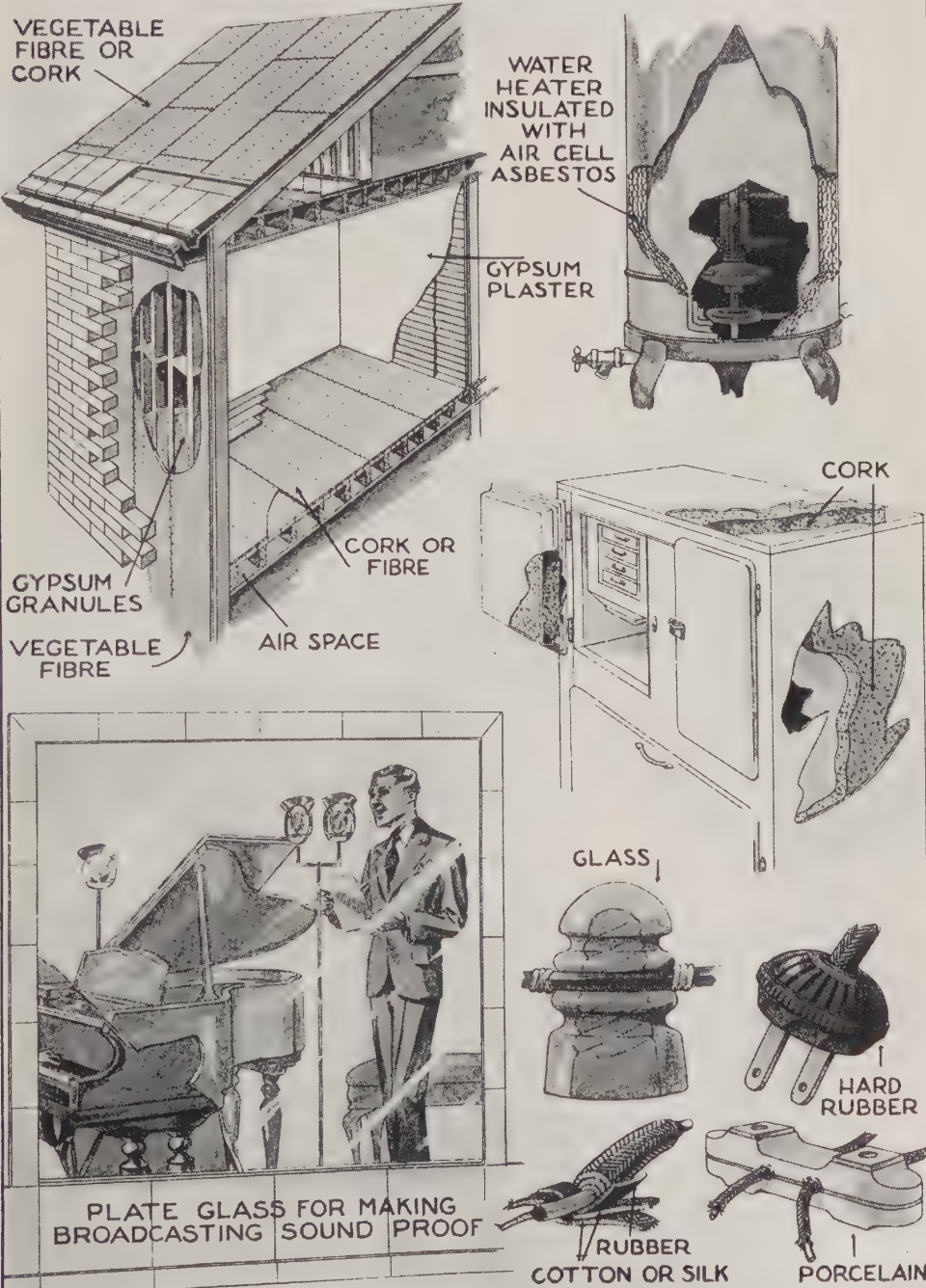
INSTITUTIONAL CHURCH, a term applied to Protestant churches which seek to identify themselves more closely with the lives of their members, and endeavor to make a more practical application of Christianity to the daily problems of living. Such churches have departed from the ancient tradition that the sole purpose of the church is that of worship and spiritual communion. The movement represents an attempt to meet the charge that the Church is not functioning in the life of its members. While the institutional church does not minimize the importance of worship and spiritual communion, it seeks to make practical its teachings within its sphere of usefulness, recognizing, as it does, that the life of its members outside of the church is as much its concern as are their spiritual needs, expressed within its communion. With this end in view, recreation parlors have been provided, either as a part of the church edifice, or of the parish house. Entertainments of various kinds, games, dancing, and social gatherings are also provided. Meals for the indigent, employment bureaus, and various other charities are sometimes included. The institutional church, in other words, is a social unit of uplift, often duplicating, in part, the work of civil and charitable organizations. In addition, by the means employed, it seeks to retain the interest of the young people in the church, and to provide for them opportunities for self-expression. See **COMMUNITY INTERESTS**.

INSTRUMENTS OF CREDIT. See **CREDIT**.

INSULATOR, a substance that does not readily permit heat, sound, or electricity to pass through it. The term *non-conductor* is often used interchangeably with *insulator*, but the latter is the more accurate, because insulating substances exhibit many degrees of resistance, and there is scarcely any substance that cannot be made to conduct energy when subjected to the proper forces. Examples of insulation are everywhere about us. Tea kettles and coffee pots have wooden handles because wood is a poor conductor of heat. Steam pipes are covered with felt or other substances that keep the heat in the pipes from escaping. Because dry earth does not conduct heat, farmers store vegetables in the ground to prevent their freezing in winter. We wear woolen clothes in winter because the air in the meshes of the wool fibers acts as an insulator and keeps the warmth of our bodies from escaping. The use of concrete in flooring is an example of insulation of sound.

Electric Insulators. The substances that conduct electricity in the least degree are dry air, glass, porcelain, paraffin, vulcanite, shellac, mica, rubber, silk, dry wood, and certain oils. The use of glass and rubber for the insulation of electrical apparatus is familiar to

USES of INSULATORS



everybody. Mica is the most important insulator used in connection with dynamo and motor armatures. The proper insulation of transmission wires is of the highest importance. Just as it is poor economy to use leaky water pipes, so it is wasteful to cover wires carrying current with materials that permit electricity to escape to the earth. A proper understanding of electrical conductance is important in the modern home, where electric energy is used for so many purposes. While chemically pure water is an insulator, ordinary water conducts very well because of impurities carried in solution. One should be careful not to touch electric switches with a wet hand. H.S.E.

Related Subjects. The reader is referred in these volumes to the following articles:

Current, Electric	Electricity (Conductors
Dielectric	and Non-Conductors)
Electrocution	

INSULIN, in' su lin, the name given to an extract derived from the "island" cells of the pancreatic gland of the ox, pig, and sheep. It is entirely distinct from the other secretion

of the pancreas, the pancreatic juice, which aids the bowels in the digestive process. The purpose of insulin is to effect the oxidation of excess sugar in the blood. The failure of these island cells to function is considered the direct cause of diabetes, and the discovery of a substitute which will perform the necessary sugar-combustion is regarded in the scientific world as one of the great discoveries of the age.

Credit for the discovery and preparation of insulin, as well as for the successful application of the serum to diabetic patients, has been accorded to a young Canadian, Dr. F. G. Banting, of the University of Toronto, with whom was associated Dr. J. J. R. MacLeod. Dr. Banting conceived the idea that this secretion could be separated from the digestive fluid of the pancreas of healthy animals, and that it could be used in the reduction of blood sugar in a diabetic patient by performing the function of oxidation, which the diseased pancreas of the patient failed to perform. See BANTING, FREDERICK GRANT; PANCREAS; DIABETES.



INSURANCE, broadly speaking, is protection against loss. Life gives rise to hazards, some of which can be foreseen more or less clearly; some, like death, are altogether beyond reckoning. It is the same with every human enterprise. No one can say what ships will come to port, what houses or factories will be destroyed by fire. Chance alone, or circumstances so numerous or uncertain that they can never be taken fully into account, determine the hazards.

As long as these greatest of all risks have to be assumed by the individual, enterprise is paralyzed. A ship merchant, for example, who is quite ready to shoulder a reasonable risk, will hesitate to engage his fortune in a venture the failure of which will involve total ruin. Such hesitation is only reasonable prudence, and ruinous risks have therefore to be assumed coöperatively by groups. Insurance has thus a considerable social significance; it binds men together by uniting their interests.

Losses which would be ruinous for any one manufacturer can be rendered relatively slight

by being distributed among a large number of manufacturers. The owner of a plant, therefore, is willing to pay a certain stipulated sum each year into a common fund, in return for the assurance that in case his buildings are destroyed by fire or damaged by an explosion, he will be protected against loss. He pays a certain definite sum for the privilege of having others share with him the risk of loss. The total fees so paid must be more than the total losses incurred by the group in any one year. This is *insurance*.

The intricate structure of modern business has given rise to many kinds of insurance: insurance against fire (fire insurance); insurance against shipwreck (marine insurance); insurance against breakage or damage to property through accident, or loss of future earnings through disablement (accident insurance); indemnification of the family in case its breadwinner is removed by death (life insurance). Under these main branches there are many further classifications, as well as insurance against sickness, unemployment, and the like.

The risk may be assumed by commercial corporations as a business, or distributed coöperatively among the members of a fraternal or labor organization. By far the greater part of insured values are entrusted, however, to the great joint-stock and mutual companies, many of which carry risks throughout the world.

Organization. Joint-stock companies and mutual companies write most of the insurance policies; the latter are more numerous, but the former carry risks many times as great. The definiteness of the obligation assumed by those who insure in stock companies has doubtless had much to do with their relative popularity. The client of a stock company (called the insured) pays a certain stipulated sum (the premium) annually, in return for which the corporation (the insurer) engages to pay certain amounts in case of loss from specified causes. In the simplest form of mutual companies, funds necessary to meet any loss are raised by assessment after the loss has occurred. In practice, however, the old mutual companies require the insured to pay a regular annual premium, holding him further responsible for his share of any additional amount that may be required to pay losses. This liability is usually limited to a fixed amount or to a certain proportion of the cash premium. Many small mutual companies, writing premiums in a restricted territory, have come into existence within recent years; they represent often the coöperative enterprise of farming communities. Such organizations as the Modern Woodmen of America and other fraternal groups issue policies according to the mutual scheme.

Fire Insurance. The working of averages, which is of the utmost importance in insurance, is well illustrated in the case of fire insurance. Statistics are carefully collected by all companies. They show how many buildings of a certain kind were destroyed by fire, on the average, each year during a long period of time. It is assumed that the future will be like the past, and that the average number of buildings of a given kind and in given surroundings so destroyed will not vary greatly. For example, the figures may show that, on the average, one pickle factory out of every thousand burns down each year. Consequently, it is assumed that the risk run by any one pickle factory in any future year is about one in one thousand. The rate is fixed accordingly, being as nearly proportionate to the risk as possible. The greater the risk, the higher the premium charged.

The applicant for insurance and the company enter into a joint agreement, which is written out in the form of a contract, or policy. The great companies have now standardized their policies, which are practically uniform. They contain explicit statements as to the liability of the company in case of loss, and indicate

under what conditions the insured's benefit will be forfeited. The applicant, for example, is required to inform the company of all circumstances known to him which may affect the nature of the risk; he must give the location of the property and the kind of business conducted in it. If he is insuring a dwelling, he will usually be obliged to say that he does not intend to store in it any particularly inflammable or explosive substance. His integrity and moral character are of interest to the company insuring him, since fires are often purposely started in order to defraud insurance companies.

On this account, fire-insurance policies are not transferred when property is sold; though in practice, companies usually allow such transfers on obtaining the proper signatures. If wilful misrepresentation or any attempt to defraud the company can be shown, it will usually be freed from its obligation to make good any losses. When partial losses occur, the usual practice is to reach a satisfactory adjustment, but in case such an adjustment proves to be impossible, the company often reserves the right to pay for repairs. When the loss is total, the owner recovers the full amount of his policy, if his property reaches that value.

Fire insurance covers all loss due either directly or indirectly to fire. Thus it includes loss by lightning, if the lightning is accompanied by fire. It includes also the damage caused by water used to extinguish the fire, and the destruction of buildings blown up to check a conflagration, as well as the injury done to property in removing it from burning buildings.

The exact number of fire-insurance companies and the total risks they carry vary from year to year. There are approximately 2,000 insurance companies in the United States. The yearly income of stock and mutual companies from premiums in the United States averages \$1,250,000,000; the total payments to policyholders for losses averages as high as \$360,000,000. The average rate of the premiums is about \$8.90 for each \$1,000.

Marine insurance is, in its large features, rather similar to fire insurance. One of the notable differences is that marine policies, like life policies, are readily assignable.

Life Insurance. Two motives inspire men to carry life insurance. Either they wish to provide for their families after their death, or they wish to make a safe investment at a reasonable rate of interest. The form of the life policy has been made extremely flexible so as to accommodate a great variety of human needs. With all the variations, it would be quite impossible to deal in such an article as this. Important general classifications are *life* policies and *endowment* policies.

Under the life policy, the insured agrees to pay a fixed premium annually for life or dur-

ing a specified period or in a lump sum, in return for which the company obligates itself to pay a certain sum to his heirs or to any named person after his death. Under the endowment plan, the company agrees to pay a certain sum to the insured himself at a future time, as in ten or twenty years. If he fails to survive the term, a certain payment is made to his heirs. Endowment policies are now much favored as investments. However the policy be written, it is essential that the premiums together should pay all the losses and all the expenses of the company, plus interest on the capital invested. The rate is determined in accordance with the principle of averages. By reference to mortality tables (see page 3980), it is possible to determine with a reasonable degree of closeness how long a person of a given age will survive. The likelihood of a long continuance of life is much less in the case of elderly than of young persons; accordingly, the rate increases with the age of the insured. Persons in bad health are often rejected as an unwarrantable risk. Those occupied in especially hazardous employments are obliged to pay a higher rate.

The life insurance in force early in 1928 in the United States and Canada amounted to over ninety billion dollars.

Since almost any commodity can now be insured, the varieties of insurance are too numerous to be given. Some of the chief forms, not enumerated above, are as follows: personal accident and health, steam boiler, plate glass, burglary, workmen's compensation, public liability, automobile, sprinkler leakage, tornado, explosion, use and occupancy, riot and civil commotion, rent and rental values, fidelity bonds, and surety bonds.

Insurance against sickness, accident, and old age has become an exceedingly important part of the social program of Germany and other European countries, and the idea meets with growing favor in North America. In the United States, such insurance schemes have been adopted by a number of large industrial organizations for the benefit of their employees. The popularity of sick benefits has been such that many companies have been organized to offer insurance against sickness, agreeing to pay from \$10 per week to \$50 per week or more in case of illness requiring medical or surgical care.

F.H.E.

Insurance in Arithmetic

In teaching insurance to young people at school, there should be a discussion of the subject in class, full and free enough to enable the pupils to understand the meaning of insurance in the business world, and to become familiar with the technical terms peculiar to the subject; such as *insurance, policy, rate, face of policy, premium, underwriters*, etc. The

students can get much information on this subject from their parents, neighbors, and business men in their neighborhood. Why are the rates of fire insurance high or low? What is the effect on rates of the location of insured property, of better fire protection, of fireproof building, of fewer fire departments, of better water supply, of nearness to sources of danger? Are rates lower in city or country? Are rates lower for apartment buildings or individual houses, etc.? All these questions can be a source of keen interest. When the student has a clear understanding of the practical side of the subject, the arithmetic arising from it is a simple matter.

Premium, or the money paid to the insurance company for "taking the risk," is expressed as a per cent of the insurance, or as so much per \$100. For example:

(a) What is the premium paid for insuring a barn for \$3,800 at 1 $\frac{1}{4}$ %?

Solution:

Insurance = \$3800

Rate = 1 $\frac{1}{4}$ %

Premium = .01 $\frac{1}{4}$ × \$3800 = \$47.50

(b) What is the premium for insuring a stock of goods valued at \$240,000, for $\frac{3}{4}$ of its value, at \$1.60 per \$100?

Solution:

Insurance = $\frac{3}{4}$ of \$240,000 = \$180,000

Premium = 1800 × \$1.60 = \$2880.00

Problems. 1. What does it cost a farmer to insure his growing crop of wheat for \$24,000 at \$2 per \$100?

Solution:

Insurance = \$24,000

Rate = \$2 per \$100

Premium = 240 × \$2 = \$480

2. A lake steamer is insured for \$250,000 at 5% per year. What premium is paid in 6 years?

Solution:

Insurance = \$250,000

Rate = 5% per year

Premium for 6 years = 6 × .05 of \$250,000 = \$75,000

3. A farmer paid \$28 for insuring a shipment of hay at 1 $\frac{3}{4}$ %; what was the face of the policy?

Solution:

\$28 = .01 $\frac{3}{4}$ of face

\$28 = .01 $\frac{3}{4}$ × face

$$\text{Face} = \$28.00 \div .01\frac{3}{4} = \$2800 \times \frac{4}{3} = \$1600$$

The student should come to see how the scope of insurance has broadened until we find it possible to be guarded against loss of almost any kind by the many and varied kinds of insurance—burglary, automobile, fire, storm, flood, drought, building contractor, or accident.

Life Insurance. Ordinary life-insurance policies are taken out at so much per \$1,000, premium to be paid annually. For example, a man takes out a \$5,000 policy at \$25.50 per \$1,000. His annual premium is 5 × \$25.50, or \$127.50, during his lifetime.

There are other insurances, as *limited*, *endowment*, and *term* insurance.

Problems. 1. If a young man takes out a \$5000 twenty-payment policy at \$27.40 per \$1000, how much will he have paid when the policy matures?

Solution:

$$1 \text{ premium} = 5 \times \$27.40 = \$137.00$$

$$20 \text{ premiums} = 20 \times \$137 = \$2740$$

When the policy matures he will have paid in, in premiums, \$2740.

2. A man pays \$73.80 annually on a \$3000 policy. What is the rate of premium per \$1000?

$$\text{Rate per } \$1000 = \frac{\$73.80}{3} = \$24.60$$

A singer may insure himself against loss of income on account of injury to his voice; the musician against loss due to injured wrist or finger; the dancer may fortify herself against similar loss through injured foot or toe, and so on. But these situations present nothing new in mathematics.

INTAGLIO, *intal' yo*, a form of engraving by means of figures or lines hollowed below the surface. The term is also descriptive of the objects thus engraved, such as signet rings, dies, and copperplates. This process is opposed to that employed in making

a cameo, the design of which rises above the background, called *relief*. In an industrial sense, the term is applied to a hollowed design intended as a mold for the reproduction of the figures or lines. See GEMS; PRINTING (Intaglio Printing); PHOTO-ENGRAVING.

INTELLIGENCE, MEASUREMENT OF. See MENTAL MEASUREMENT.

INTELLIGENCE OF ANIMALS. See ANIMAL (Animal Intelligence and Senses); INSTINCT.

INTELLIGENCE QUOTIENT. See MENTAL MEASUREMENT (The Measurement of Intelligence).

INTELLIGENCE TESTS. See MENTAL MEASUREMENT.

INTENDANT, in French colonial history, the treasurer of a colony or settlement. See FRONTENAC, COMTE LOUIS.

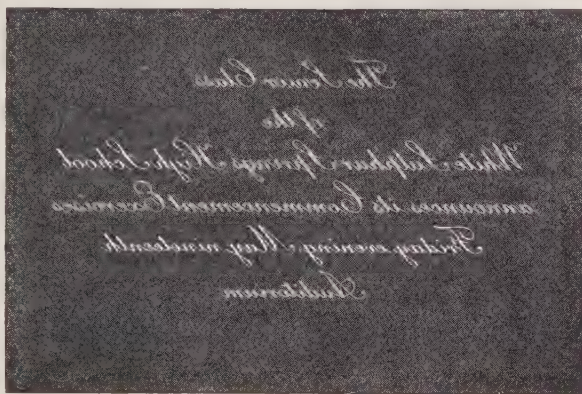
INTENSIVE FARMING. According to the United States Department of Agriculture, "the man who makes every part of his land produce, either directly or indirectly, is an in-

tensive farmer, if he makes it produce to its utmost in quantity and quality." In Europe most of the farms are small, and the density of population compels intensive farming. Consequently, every square rod of tillable land is under cultivation, and the farmers keep their soil in such a high state of fertility that, notwithstanding the thousands of years of cultivation, the production per acre increases from year to year. All waste that can possibly be used for fertilizer is saved, and to this are added green-manure crops and commercial fertilizer. By these means the fertility of the soil is constantly increased, and the European farmer obtains a yield per acre from one-third to one-half larger than the American farmer.

In America, land has been plentiful and cheap, and labor relatively high, and the farmer has tilled large farms, doing as little intensive work as possible, and leaving nature to do as much as possible. Under the conditions that have prevailed in America, the farmers could not profitably apply the more intensive methods of the European agriculturists. Now that land is becoming more valuable in America, more thorough and scientific methods of tillage are indicated for the future. The following lines of agriculture are especially adapted to intensive farming:

Dairying. Many farmers do not know whether they are keeping cows at a profit or a loss, simply because they keep no record of the milk and butter fat produced by each cow. An intelligent study of the herd will lead to an improvement that will greatly increase the dairyman's profit. The Agricultural College of Illinois estimates that the scientific management of a dairy herd, including the raising and harvesting of the crop and proper feeding, will increase the present profit in milk-production fivefold.

Fruit Growing. The application of intensive farming to fruit-growing is well illustrated in the raising of apples. The fruit-grower aims to secure the largest possible quantity of salable fruit. This necessitates careful attention to the orchard, and the wise use of cover crops. Pruning, spraying, and tillage are all necessary to a good crop. These suggestions apply with



INTAGLIO PLATE

The letters are cut into the plate (incised) and reversed. The reader may hold the illustration before the mirror and read the lines.

equal force to the raising of peaches, pears, plums, grapes, and small fruits.

Truck Farming. All truck farming is necessarily intensive; success depends upon a fertile soil, constant and thorough tillage, and a wise use of fertilizer. Such crops as onions, tomatoes, lettuce, cabbage, and cauliflower usually yield a profit of several hundred dollars per acre when they are properly cared for.

Irrigated Land. All land under irrigation is farmed intensively. The crops in the irrigated districts usually consist of fruit, vegetables, and alfalfa. Since the water obtainable can irrigate only small areas, the farmer must realize the largest possible profit from his land. Therefore the farms are small and under a high state of cultivation.

Possibilities. The best farm lands in the United States and Canada are not excelled by those of any other country, yet their average production is scarcely more than one-half of what it might be under intensive farming. The tendency now is to meet new conditions by breaking up the large farms and ranches into small farms which will be more thoroughly and intelligently cultivated. C.F.C.

INTERCARDINAL POINTS. See COM-PASS.

INTEREST (IN BUSINESS). Interest is money paid for the use of money. We pay *rent* for the use of another's farm, garage, house, etc.; we pay *hire* for the use of another's automobile, etc.; and we pay *interest* for the use of another's money.

Interest is expressed as a percentage of the sum of money borrowed. The sum borrowed is called the *principal*; the percentage paid is called the *rate*. The rate named is for the use of the principal for one year; for example, when we say that a man borrows \$7,000 for 4 years at 6%, we mean that he must pay *each year* as interest 6% of \$7,000, or \$420. Interest is paid very often *semi-annually*; at times *quarterly*, and at times *yearly*.

Problems. 1. Mr. Green borrows \$1500, January 2, 1917, for 5 years at 6%, interest payable semi-annually. What is the semiannual interest? When is the first interest due?

Solution:

$$\text{Prin.} = \$1500$$

$$\text{Rate} = 6\%$$

$$\text{Semiannual Int.} = .03 \times \$1500 = \$45$$

$$\text{First interest is due July 2, 1917}$$

2. Mrs. Mallon borrows \$1750 at $5\frac{1}{2}\%$ for 3 years, interest payable annually. What is each annual interest? What is the interest for the entire time?

Solution:

$$\text{Prin.} = \$1750$$

$$\text{Rate} = 5\frac{1}{2}\%$$

$$\text{Time} = 3 \text{ yr.}$$

$$\text{Annual Int.} = .05\frac{1}{2} \times \$1750 = \$96.25$$

$$\text{Entire Int.} = 3 \times \$96.25 = \$288.75$$

3. What is the interest paid for the use of \$75,000 for 8 years at $4\frac{1}{2}\%$?

Solution:

$$\text{Prin.} = \$75,000$$

$$\text{Rate} = 4\frac{1}{2}\%$$

$$\text{Time} = 8 \text{ yr.}$$

$$\text{Int.} = 8 \times .04\frac{1}{2} \times \$75,000$$

$$\text{Int.} = .36 \times \$75,000 = \$27,000$$

Methods of Computing Interest. (a) *The Direct Method.* When the principle involved is clear, this method will be popular:

Find the interest on \$360 for 2 yr. 5 mo. 20 da. at 6%.

$$5 \text{ mo. } 20 \text{ da.} = \frac{5\frac{2}{3}}{12} \text{ yr.} = 1\frac{2}{3}\% \text{ yr.}$$

$$\text{Prin.} = \$360$$

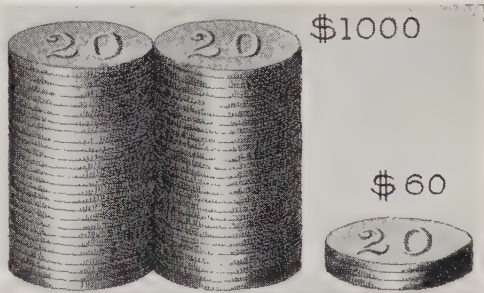
$$\text{Rate} = 6\%$$

$$\text{Time} = 2 \text{ yr. } 5 \text{ mo. } 20 \text{ da.}$$

$$\text{Int.} = 2\frac{2}{3} \times .06 \times \$360$$

$$\text{Int.} = .14\frac{2}{3} \times \$360 = \$53.40$$

To use this method, we must learn to tell readily



"PUTTING MONEY TO WORK"

One thousand dollars put at interest at 6 per cent per annum yields \$5 per month, or \$60 per year, interest.

what part of a year any number of months and days are.

$$7 \text{ mo. } 12 \text{ da.} = \frac{7\frac{2}{3}}{12} \text{ yr.} = 3\frac{1}{6}\% \text{ yr.}$$

$$4 \text{ mo. } 10 \text{ da.} = \frac{4\frac{5}{6}}{12} \text{ yr.} = 1\frac{5}{6}\% \text{ yr.}$$

$$6 \text{ mo. } 6 \text{ da.} = \frac{6\frac{1}{2}}{12} \text{ yr.} = 3\frac{1}{4}\% \text{ yr.}$$

$$8 \text{ mo. } 20 \text{ da.} = \frac{8\frac{2}{3}}{12} \text{ yr.} = 1\frac{2}{3}\% \text{ yr.}$$

Find the interest on \$12,800 for 8 mo. 20 da. at $4\frac{1}{2}\%$.

$$\text{Prin.} = \$12,800$$

$$\text{Rate} = 4\frac{1}{2}\%$$

$$\text{Time} = 8 \text{ mo. } 20 \text{ da.}$$

$$\text{Int.} = 1\frac{2}{3} \times .04\frac{1}{2} \times \$12,800$$

$$\text{Int.} = .03\frac{1}{4} \times \$12,800 = \$416.$$

(b) *The 6% Method.* The interest for one year on any principal at 6% is .06 of the principal; for *one month* it is $\frac{1}{12}$ of .06 or .005 of the principal; for *six days* it is $\frac{1}{2}$ of .005 or .001 of the principal; for *one day* it is $\frac{1}{6}$ of .001 or .000 $\frac{1}{6}$ of the principal.

Put into more concise form, we have:

$$\text{Int. for 1 yr.} = .06 \text{ of Prin.}$$

$$\text{Int. for 1 mo.} = .005 \text{ of Prin.}$$

$$\text{Int. for 6 da.} = .001 \text{ of Prin.}$$

$$\text{Int. for 1 da.} = .000\frac{1}{6} \text{ of Prin.}$$

relationship between the demand for and the supply of capital determines what the rate of interest shall be.

The rate of interest was very high during the World War and the post-war period. The demand for capital much outstripped the supply of it, partly because there was such a wholesale destruction of capital as a phase of the war; but later, interest rates returned to lower levels. The demand has been enormous, but the supply has increased at an even more rapid rate. There has been much talk about the extravagance of the people, but along with their liberal spending has gone an enormous amount of saving. As a result, capital has become more abundant in relation to the demand for it, and, in consequence, interest rates have declined.

Legal Interest Rates. The rates of interest lawful in the United States are given here:

STATE	LEGAL RATE	BY CONTRACT
Alabama.....	8	8
Alaska.....	8	12
Arkansas.....	6	10
Arizona.....	6	10
California.....	7	12
Colorado.....	8	12
Connecticut.....	6	6
Delaware.....	6	6
Dist. of Columbia.....	6	8
Florida.....	8	10
Georgia.....	7	8
Hawaii.....	8	12
Idaho.....	7	10
Illinois.....	5	7
Indiana.....	6	8
Iowa.....	6	8
Kansas.....	6	10
Kentucky.....	6	6
Louisiana.....	5	8
Maine.....	6	12
Maryland.....	6	6
Massachusetts.....	6	Any
Michigan.....	5	7
Minnesota.....	6	10
Mississippi.....	6	8
Missouri.....	6	8
Montana.....	8	10
Nebraska.....	7	10
Nevada.....	7	7
New Hampshire.....	6	6
New Jersey.....	6	6
New Mexico.....	10	12
New York.....	6	6
North Carolina.....	6	6
North Dakota.....	6	10
Ohio.....	6	8
Oklahoma.....	6	10
Oregon.....	6	10
Pennsylvania.....	6	6
Porto Rico.....	6	12
Rhode Island.....	6	Any
South Carolina.....	7	8
South Dakota.....	7	12
Tennessee.....	6	6

STATE	LEGAL RATE	CONTRACT
Texas.....	6	10
Utah.....	8	12
Vermont.....	6	Any
Virginia.....	6	6
Washington.....	6	12
West Virginia.....	6	6
Wisconsin.....	6	10
Wyoming.....	8	12

In Canada. The legal rate of interest throughout Canada is established at five per cent, but any higher rate may be stipulated by agreement between contracting parties. However, by the terms of a law affecting professional money-lenders, no rate may exceed twelve per cent on \$500 or less. See USURY. E.J.

INTEREST (IN PSYCHOLOGY). Children on a playground engage in different sorts of play. Some are swinging, others are climbing poles, and others playing ball. When permitted to choose their subjects, high-school students indicate their individual likes and dislikes in the selection of their studies. John may choose a course in agriculture, and Henry one that will lead to a professional career. Mary may choose household arts, and Helen may select such studies as will prepare her to become a teacher. What is the cause of these different choices? The answer is that each chooses that which most strongly appeals to him, that in which he finds the highest satisfaction. In other words, each chooses the line of work in which he is the most deeply interested.

Interest is the value in ideas; we are interested in whatever satisfies our physical, intellectual, and spiritual wants. The child's first interest is in whatever ministers to his physical needs, such as food, clothing, shelter. His next interests are in those things that satisfy his mental needs, such as the mother's soothing care, the bright toy, and the daily play with some one who can give him the exercise his system craves. His interests are both pleasurable and painful. He derives pleasure from his cup of milk and eagerly looks for the next cup when the time for it arrives. But after he has burned his hand on a hot stove, he is interested in avoiding it.

Interest is a feeling, and like any other feeling, it is individual. The same object will arouse interest in some and aversion in others, and still others will look upon it with indifference. Interest is one of the strong characteristics of personality, and while many people may have similar interests, the interests of no two persons are identical.

Interest is immediate and remote—immediate when it is placed on something that satisfies present needs, like food when one is hungry, and a game of ball when one desires physical exercise. It is remote when fixed upon something to be attained in the distant future, such

as entering upon a profession for which years of preparation are necessary, or the acquisition of wealth as the result of a long business career. When the remote interest is determined, it becomes the guiding motive of one's life, and all the immediate interests are subservient to it.

Interest and attention are inseparable. We attend only to that which interests us. Interest is also affected by knowledge. The child takes no interest in those objects which have no significance to him. New ideas must bear some recognizable relation to those already in his mind, before his interest in them can be awakened. But when the new idea is thus related, the new and the old blend and strengthen each other, and the interest in both is increased. It is by this development of interest through the association of ideas that one's store of knowledge is acquired. Prof. William James gives the following rule for securing and retaining interest:

An object not interesting in itself may become interesting through becoming associated with an object in which interest already exists. The two associated objects grow, as it were, together: the interesting portion sheds its quality over the whole; and thus things not interesting in their own right borrow an interest which becomes as real and as strong as that of any natively interesting thing.

Another important principle is that action lends interest. A crowd will watch a moving sign, when one without motion attracts little or no attention. The teacher who is active, who can make scissors and crayon talk, will hold the interest of her pupils. Vocational training prolongs school attendance because the opportunity to do things holds the pupil's interest in his work.

A third principle is that the more senses the child can use in obtaining a knowledge of an object, the greater his interest in it. If he can touch it, smell it, and taste it, as well as look at it, his interest will last until he has experienced each new sensation. Illustrations increase the interest in a book because they enable the reader to gain at a glance a comprehensive idea of the subject. Teachers and parents who understand this principle supply their children with books having good illustrations.

Interest lies at the foundation of all our studies, and should lie at the foundation of our occupation. Work in which we take no interest is the merest drudgery, and that young person who discovers that he has entered upon an occupation for which he is acquiring a growing dislike should make a change before it is too late. C.E.S.

INTEREST, LEGAL RATES OF. See **INTEREST (In Economics)**.

INTERFERENCE. See **RADIO COMMUNICATION; INTERFEROMETER.**

INTERFEROMETER, *in tur feer om' e tur*, any apparatus which measures distance, angles, movement, displacement, or refractive indices by the interference of light. Such devices, when first used early in the nineteenth century, were also called "interferential refractometers."

With interferometers invented by himself, Professor A. A. Michelson was able to measure the velocity of light, the length of light waves, and to make the first accurate measurements of a star's diameter, that of Alpha Orionis, or Betelgeuse. The interferometer was used in making the famous Michelson and Morley experiment to ascertain the velocity of the earth through the ether, whose negative result had an important effect upon the development of Einstein's Theory of Relativity. The instrument is an important tool in astronomy, for stars too distant or too faint to be measured by the most powerful telescopic lens send out light waves which may be measured when the interferometer is used with the telescope; from these waves, the direction, distance, size, and character of their source may be determined.

The phenomena of interference, upon which the interferometer is based, can only be outlined briefly here. It is necessary, in order to understand the principle of interference, to keep in mind the wave theory of light, discussed in these volumes in the article **LIGHT**. Dropping two pebbles into a still pool of water will set in motion two series of waves which meet. Where crests and troughs of waves coincide, the movement is more intense. However, where the crest of one wave series meets the trough of the opposing series, the motions neutralize each other, resulting in at least partial quiet. This is a simple illustration of wave interference in light and in sound as well.

The phenomena of interference of light may be observed in a soap bubble, where the reflection of light from different and constantly varying surfaces brings to the eye bands of beautiful colors. A result more permanent and useful to an observer may be obtained from passing light through two thicknesses of glass separated very slightly at one edge. Here, the result will also be varied color, for the white light is being broken up into its parts or colors. If a piece of blue glass, for example, is put in the path of the light, the resulting color bands will be alternately blue and black. This effect is due to the alternate coincidence and interference of the light waves from the two surfaces, resulting in periods of intense color and of absence of color and darkness. These colored bands are known as "interference fringes," and it is the measurement and observation of such fringes which determine the distance, size, etc., of the object from which the light comes.

The principle of interference of light is used in both microscopes and telescopes, and the light waves are so minute that great exactness in results is obtained. However, there are limits in their observation powers, which are banished by the use of the interferometer. Actually, a microscope or telescope may be converted into an interferometer by modifying the lens so as to admit light only through a narrow aperture on each side; thus, the light striking the lens is divided and reunited again in the final image. Practically, however, that device is improved upon by means of reflectors so that the "interference fringes" may be made larger without decreasing the brightness of the light, and therefore accuracy may be greater.

Although several forms of interferometer are manufactured by makers of scientific instruments, the first Michelson device serves to illustrate a useful type. In this instrument, a beam of light is split into two parts by a mirror in its path. This mirror is only partially silvered, which allows part of the light to pass through the mirror, then through a plain glass parallel with the "half-silvered" glass, and on to another mirror, which reflects it back on its own path. The other part of the light is reflected from the "half-silvered" mirror at right angles; it goes on to a mirror which reflects it back along its course to the starting point. The two parts of the beam meet, therefore, at the point where they were divided. The meeting of these two returning series of light waves produces "interference fringes," which, when measured and observed, give information to a physicist or astronomer as to the source of the light.

The interferometer is also used to measure the refractive indices of gases, in cases where minute measurements are necessary. One practical form is a portable size which can be used to detect the presence of fire damp in coal mines. The interferometer has also been used to measure very high temperatures, such as those of blast furnaces, to measure expansion and elasticity, and in testing the accuracy of precision screws. In all of these cases, the measurement has to be of the greatest accuracy; the screw, for example, is tested for an error as small as a ten-millionth part of an inch. The

form of the instrument now used with astronomical telescopes is known as the "beam interferometer."

Related Subjects. The reader is referred in these volumes to the following articles:

Astronomy
Einstein's Theory of
Relativity
Light
Stars
Telescope



AN INVITATION TO EASE

The simple arrangement of books, screen, lamp, chair, etc., speak of comfort and good taste, rather than opulence and display.

and jointly from the departments of War and the Navy, the Pension Bureau. The custody of certain public buildings was transferred from the care of the President to the new department. Besides the above, the department was given charge of the Geological Survey, the Bureau of Mines, and the Reclamation Service. In 1868 the Bureau of Education was attached to the Department of the Interior. In 1912 the Bureau of Child Welfare was organized and made a branch of this department. When the Department of Commerce and Labor was organized in 1903, the Bureau of the Census was transferred to it, and later to the Department of Commerce; in 1925 the Patent Office was placed with the Department of Commerce. The Copyright Office is now a distinct division in the Library of Congress.

The Secretary of the Interior is appointed by the President, with the approval of the Senate, and receives a salary of \$15,000 per year. See CABINET.

INTERIOR DECORATION. Pictures of reindeer, wild boar, and prehistoric animals, scratched on cave walls by men who lived before written history began, are silent wit-

COLOR *in* HOME DECORATION



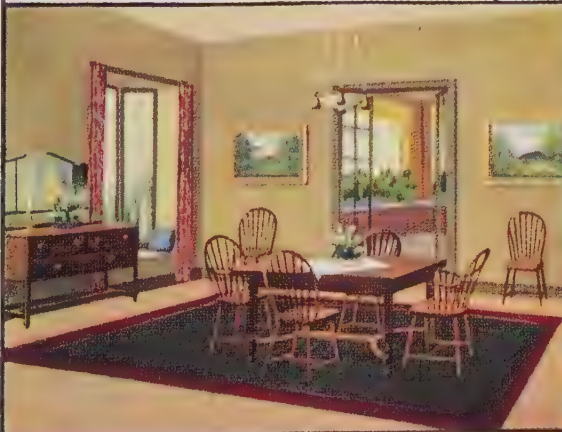
ONE SIDE OF A COMFORTABLE LIVING ROOM - AS VIEWED FROM ENTRANCE



NORTH BEDROOM - WARM TINTS IN DECORATION



SOUTH BEDROOM - COOLER TINTS IN DECORATION



ATTRACTIVE DINING ROOM



GOOD TREATMENT FOR KITCHEN

nesses that man in the childhood of the race sought beauty and adornment as we seek it now. Just as he wanted decoration for his body, so he tried to beautify the place which sheltered him. Through the years, from times of struggle for self preservation to the present day, when men have more leisure to create beautiful things, this desire has persisted, and it is as instinctive as the desire for food and shelter. All of the arts of design have contributed to it.

The term *interior decoration* defines itself as the art of decorating and furnishing the interior of a building. It may concern public buildings, churches, and museums, as well as home decoration, but is commonly applied to the latter form. Artists, architects, and cabinet makers have done "interior decorating" for centuries, and many architects to-day plan both the exterior and the interior of houses. The interest in home decoration has established such work as a separate profession, some decorators working in conjunction with their own shops, which sell household merchandise, and others acting simply as "consulting decorators." The rise of schools

of interior decoration has added many new members to the profession; many unskilled persons have entered it as a lucrative business. As a protection against the untrained, and to aid in forming standards for a comparatively new work, several associations of skilled decorators have been formed.

All aspects of home decoration, including walls, floors, and floor coverings, windows, and furniture, are covered in separate books, and there are many devoted to the subject as a whole. The history of home decoration may be traced chiefly through the history of furniture itself, for it reacted inevitably on wall decoration and background. The various types of furniture representative of "periods" in decoration are discussed in the article FURNITURE. The interest in interior decoration and the changing of popular taste has caused a noticeable trend toward simplicity in furnishings. French and Italian Renaissance

styles are reserved for formal and pretentious homes; adaptations of early American and English styles are used in most American homes whose owners are people of good taste and moderate income.

If one knows nothing about the principles of home decoration, has neither time nor patience to learn, and can afford the services of a trained decorator, it is, of course, far easier to place the decorating of one's home in the hands of such an expert. For those who want a beautiful home, but cannot afford to hire a decorator, there is the possibility of learning the principles which govern artistic decoration, with the real joy of working out one's own plans for a home of comfort and charm. The result will embody the personality of its owner more certainly than professional decoration could, if wisdom, common sense, and good taste are employed.

The task of decorating for oneself is not of the "abracadabra" type; it takes hard work. Few of us have taste inherently good enough to select a scheme of decoration and carry it to successful completion by intuition. The basic principles of decoration

must always be kept in mind. Books on related subjects, the study of good interiors, and a constant attempt to discriminate between good and poor decoration will all help in training one's own judgment. Only the barest principles of the subject, those which may apply to any situation, may be given here.

One rule almost never violated is that which says that the floor of a room shall be darkest in color value, the walls a mid-tone, and the ceiling the lightest value of the three. This has a logical basis in nature, with its dark earth, green trees, and blue sky, and gives a comforting solidity underfoot. It is well to remember, in a small or medium-sized house, that similar schemes of decoration for rooms that open into each other will make the rooms seem larger.

Floors and walls are the backgrounds of the decorative scheme, and should never obtrude themselves upon it. If floors and their cover-



A WELL-APPOINTED CORNER

The pleasing effect is achieved by well-chosen drapes, lamp, table, chair, and cushions. They are harmonious, yet pleasingly varied in color and texture.

ings are dark and unobtrusive, they will support almost any type of decoration. If figured rugs are preferred, the figures should be small and inconspicuous; large patterns and medallions have a tendency to make the room look smaller. Plain-color velvet or chenille rugs are popular now; Orientals are expensive, but have remarkable wearing qualities, and good Orientals add great richness and beauty. Rugs should not be placed cornerwise, but parallel with the sides of the room, for diagonal lines of this sort should be avoided.

Where the wood-work of the room is of excellent quality, it seems best to finish it naturally in a dull wax polish, showing the texture of the wood. A very popular method to-day is to paint the woodwork either the same shade as light walls, or a cream color which will harmonize with them. Paint in soft, dull finishes, calcimine, and wall paper are all popular wall treatments. One easily tires of a wall paper which displays yards of naturalistic roses or pansies, and figured wall paper should be used with great discrimination. Plain wall paper furnishes a background for pictures and other parts of the decorative scheme, without interfering with it. The modern method of electric lighting—wall lights, or inverted lighting in a central fixture, with reading and floor lamps—not only provides light where it is needed, but does away with the glare of unprotected lights. Nothing can give a room charm and personality more truly than shaded lights and areas of pleasant shadow. With this method, however, care must be taken to provide plenty of small lamps where people may read or sew, or do other work impossible in a dim light.

Window coverings have so wide a range that it is impossible to set down more than a few definite rules about their scope. For actual

shade, either window shades of unvarnished cloth or drapes which pull across the window are used. Directly covering window glass, curtains of scrim or net may or may not be used, but if used should hang straight. Any

window drapes used should also hang straight, to avoid a break in the vertical line of the windows. The great variety of cloth for drapes, much of it "sun-fast," gives wide possibility of choice, which must depend upon the furnishings and other decoration. To avoid a spotty effect, figured or flowered drapes should be used only when the effect of furniture and rugs is plain in color.

No matter how closely the foregoing rules and others not stated here were used, a room could be absolutely drab and uninteresting without attention to what is perhaps the most important phase of interior decorating—that is, color.

Much depends upon the location of rooms, so far as the color chosen for them is concerned. If a room is on the north side of the house, or does not receive much light, it should be decorated in warm, light-giving colors. In a region where sunlight is hot and constant, cool colors will add to the comfort of the room.

[The whole study of colors is a fascinating one. The article COLOR in its chart gives an illustration of warm and cool colors. All of those colors from yellow to violet which include the red and red-orange tints are warm colors; those from yellow to violet which include blue or blue-green are cool colors.]

Other considerations will also govern choice of color. If a person has a beautiful and striking bit of pottery, a vase, or piece of tapestry, he may wish to choose colors which harmonize with it and complement it; it becomes the point of focus for all the other furnishings. No primary color should be used in its natural vividness except in a small



NO DISCORDANT NOTE

Plain-tone walls and floor coverings are relieved by gay chintz hangings and pleasing design in the bed cover, as well as bric-a-brac and dresser.

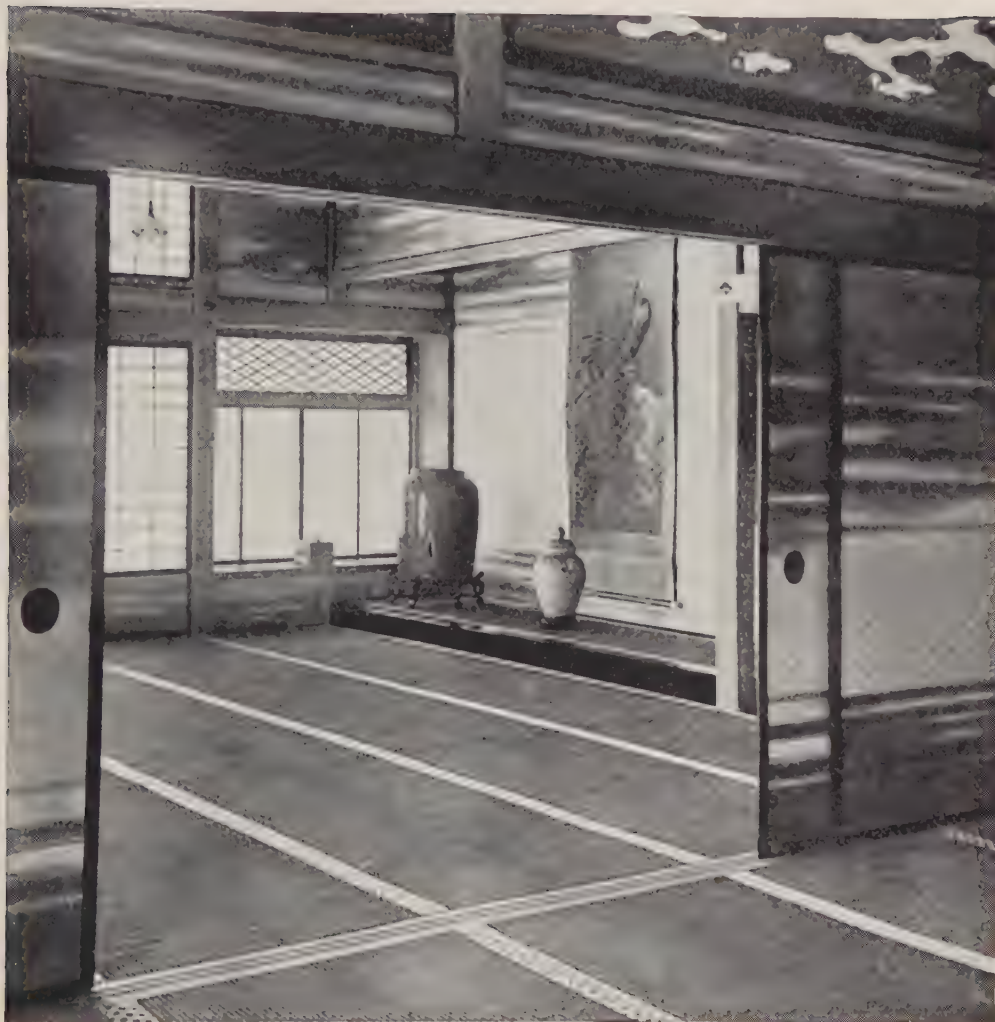


Photo: U & U

THE PERFECTION OF DECORATIVE ART IN JAPAN

Japanese taste forbids the crowding of any room with bric-a-brac.

object, for an accent or point of focus. Often, however, several shades of one color are used as a unified scheme; this may be very good or very bad. No one would think of using a scheme which included red and pink, which are related in this way. If it is good, the monotony of one color should be relieved by a contrasting note of its complementary color. Walls are usually good in light grayed shades of the color chosen; white ceilings should be avoided, because white areas attract the eye.

When the furnishing of the room is to be considered, there is no substitute for good taste. One of the most important lessons the amateur decorator needs to learn is that costly furnishings do not make a charming room. They may do so, but not unless they are wisely

chosen for their comfort, fitness, and beauty. The most charming rooms are those which express the owners' personalities in successful combinations of color values and form. The movement toward the simplicity of English and early American styles in furniture is doing much for that maxim of decoration which says, "Have nothing in your home which you do not know to be useful and believe to be beautiful." Furniture must be appropriate for its intended use.

Together with the maxims of usefulness and fitness goes that of simplicity. Bare spaces are infinitely to be preferred to jumbles of bric-a-brac. Pictures should not be strewn about indiscriminately and should be hung on hooks flat against the wall, or from two fine cords

attached to a picture molding. Personal photographs and more intimate pictures will not be placed in profusion in the living room, or the room in which casual visitors are entertained.

The charming, "lived-in" look of a room depends more upon its owners than upon its scheme of decoration. Books, pottery, lamps, or candles may express their individuality, but the objects of art should be few and well chosen. The home of charm cannot be littered with a hodgepodge of trifles. It is restful, well ordered, and harmonious.

INTERJECTION, *in-tur-jek' shun*. The name *interjection* largely explains the nature of this part of speech, for it is derived from two Latin words meaning *thrown in between*. The interjection is an exclamation—expressing surprise, pain, or some other sudden or intense feeling—thrown into the sentence as an independent element. It bears no grammatical relation to the other words and is not needed to complete the sense; yet, rightly used, it strikes the emotional keynote of the sentence. Because of this characteristic, it has been likened to a small boy sitting on the fence at a baseball game and exclaiming delightedly or disgustedly, as the case may be, over the playing of the team.

Among interjections are included both special words which have no other use, such as *alas!* and words belonging to other parts of speech when used in an exclamatory sense. Almost any word belonging to any part of speech may serve as an interjection, the voice or the punctuation marking it exclamatory. The following sentences are given in illustration: "*Bugles!* and the great nation thrills and leaps to arms!" "*He!* What can he do unaided?" "*Hark!* Hark! the lark at heaven's gate sings." "*Quick!* catch hold of the rope!"

O and **Oh**. While the line is not now sharply drawn between these two forms of the interjection, *O* is generally used in expressions of wishing and always in direct address or apostrophe. In Hamlin Garland's poem, *In the Grass*, the interjection in one verse introduces a wish:

O to lie in long grasses!
O to dream of the plain!

and in a later verse is used as the interjection of address:

O far-off plains of my west land!
O lands of winds and the free,
Swift deer—my mist-clad plain!

Oh has a wider and more common use, indicating various emotions, such as surprise, pain, grief, fear, horror, or longing. Thus, in Mark Antony's phrase, "Oh, what a fall was there, my countrymen!" the interjection expresses mingled horror and sorrow.

INTERLAKEN, *in' tur-lah ken*. See SWITZERLAND (The Cities).

INTERLOCUTORY INJUNCTION. See INJUNCTION.

INTERMARRIAGE. See MARRIAGE, subhead.

INTERMEZZO, *in tur-med' zo*, a short, musical piece, generally of light, sparkling character, introduced between the acts of a serious opera or drama. Almost all of the earlier Italian plays were relieved by intermezzi, many of these being at first merely simple songs. In 1733, through the influence of Pergolesi, an Italian

composer, the intermezzo was with great success performed as a separate work in one act. Not until seventeen years later (1750) was it introduced in this form into England. The intermezzo still holds a place upon the stage as an independent piece, although the dance has now displaced it somewhat. The *Entr'actes* composed by Beethoven for Schiller's *Egmont*, by Schubert for *Rosamunde*, and by Mendelssohn for Shakespeare's *Midsummer Night's Dream*, are familiar to all music-lovers. The intermezzo played during the intermission in Mascagni's popular opera *Cavalleria Rusticana* is also a general favorite.

INTERMITTENT FEVER. See FEVER.
INTERMOUNTAIN UNION COLLEGE. See MONTANA (Education).

INTERNAL-COMBUSTION ENGINE. See GAS ENGINE; DIESEL ENGINE.

INTERNAL EAR. See EAR.

INTERNAL REVENUE, that part of the income of a government which is derived from taxes imposed upon commodities manufactured



THE CHOICE OF WALL COLORS

Little comment on the above pictures is necessary. The large-figured paper obscures what otherwise would be chaste decoration.

within the country, thus being distinguished from taxes upon imports, called customs duties, tariffs, or foreign revenue. In the system of taxation employed in Canada, Great Britain, Australia, and other dominions, these internal taxes are called *inland revenue*, or excise duties; the economic principle is the same in all countries, by whatever name the tax may be called.

Every government must raise money to defray its expenses; the best means to employ is considered a serious problem. The means by which revenue can be secured are few:

(1) A direct tax may be levied upon every person, regardless of age or sex; this would be a very heavy burden.

(2) A direct Federal tax might be levied upon the property of individuals, which is the system employed in raising state and local revenue.

(3) The entire sum might be raised by heavy duties on imports, but the burden might not be equitably distributed.

(4) It might result wholly from taxes upon articles of domestic manufacture, but the same objection might be advanced.

The United States has levied direct taxes upon the people's property only three times, and then only as emergency measures—in 1789, 1812, and 1861. More than a billion and a half dollars was appropriated for many years by each Congress before 1916 to support the government, or at the rate of about \$750,000,000 per year; after the war, for a number of years over \$3,000,000,000 yearly was required, and it is probable that expenses of government will never again fall below \$2,000,000,000. Of this vast amount, about one-fourth is secured from foreign import taxes, about \$250,000,000 from postal receipts, a billion in round numbers from income taxes, and the balance from taxes upon domestic manufactures.

When once it was determined to levy an internal-revenue tax, there were differences of opinion as to the articles which should bear the burden—whether they should be selected from the lists of necessities or from luxuries only. The latter plan was determined upon, except when the nation faced extraordinary demands, and choice was limited as much as possible to those things which, through over-indulgence, may be called vices. Thus, liquors and tobacco in all their forms have been made to yield a revenue since the first excise bill was passed in 1791. The law of that year was very unpopular; the people were not prepared to accept the new economic measure, particularly in Pennsylvania, where, in 1794, the Whisky Insurrection (which see) occurred.

Every war the country has waged has made immediate demands for increased revenues, and internal taxes have proved the quickest and surest source. They may be expanded at

any given time to cover a great variety of articles. Therefore, when the wars of 1812, 1845, 1861, 1898, and 1917 necessitated larger revenues than were flowing into the Treasury, taxes were placed upon bank stocks, checks, legal papers, matches, playing cards, licenses, theater tickets, gross receipts of railroads and insurance companies, and the like. With the passing of the emergencies, the tax was each time decreased by repeal of provisions applying to specified articles.

Alcoholic liquors formerly produced the greater part of the revenue in every internal-revenue law passed in the United States, but national prohibition largely cut off this source of income. At the present time, oleomargarine, or butterine, adulterated butter, snuff, tobacco, opium, playing cards, net corporation profits above specified sums, and personal incomes are among the items taxed (see *INCOME TAX*).

Internal-revenue taxes have always been opposed to some extent by the people. They necessitate government interference with private affairs, in that manufacturers must make reports of their products and submit to inspection; they increase cost of manufacture, and in many cases demand employment of additional capital, and finally add to the price that the consumer is obliged to pay. Nevertheless, with respect to the last contention, the proportion of each purchase which the tax represents is extremely small, and in times of peace, usually the items taxed are such as one need not purchase unless he wishes to do so. It is less of a financial burden than a direct annual cash contribution from each member of a family.

In the United States, from 1801 until the second war for independence, internal-revenue taxes were abolished by the political party then in power, which was the forerunner of the present Democratic organization, on the ground that they were unnecessary to American institutions. But war necessities restored them, and since then they have been recognized as a most important feature of the nation's financial policy. See *TAX AND TAXES*. E.D.F.

Related Subjects. For a discussion of the *INLAND REVENUE* of Canada and Great Britain, see that title in these volumes.

INTERNATIONAL, THE, a name given to certain associations of workmen whose common purpose has been the organization of the workers of all countries, that, through united action, they may secure a just share of the rewards of labor. The earliest of such organizations was founded in 1864 by Karl Marx (which see), the great German socialist. His International Workingmen's Association held congresses at Geneva, Lausanne, Brussels, and Basel, between 1866 and 1869. These congresses demanded, among other reforms, the eight-hour day, state ownership of soil and

of public utilities, and the abolition of war. Though the Social Democratic party of Germany was organized, in 1869, by Marx and his followers, the movement lost ground in other countries, partly because of internal dissension. In 1889 the International was revived at a meeting in Paris, and several congresses were held up to 1914, when the outbreak of the World War prevented the meeting of the congress scheduled for assembling in Vienna. Antimilitarism was a dominant note at these later congresses.

Second and Third Internationals. In February, 1919, delegates from twenty-six nations, including most of the European nations, assembled at Berne, Switzerland, in an attempt to revive the pre-war International. This congress, now referred to as the Second International, discussed responsibility for the war, boundary settlements, the Russian situation, the status of labor, and the League of Nations, and appointed a committee to deal with the matter of reorganization. The following August, the committee for the reconstruction of the Second International met at Lucerne, and the result of their efforts was the reconstitution of the organization at a congress held in Genoa in August, 1920. Another body of workers, of somewhat more radical tendencies, which organized in Vienna in 1921, and which became known as the Second and a Half International, subsequently merged with the other group, and the united organization now has a permanent seat in London. Arthur Henderson, J. H. Thomas, and J. Ramsay MacDonald, prominent English labor leaders, are among its members.

The Third International is dominated by the Communist party of Russia, but includes radicals from all over the world. Its formal organization dates from March, 1919, and its headquarters are at Moscow.

INTERNATIONAL AFRICAN ASSOCIATION. See BELGIAN CONGO.

INTERNATIONAL ARBITRATION. See ARBITRATION.

INTERNATIONAL BANK. See INTERNATIONAL SETTLEMENTS, BANK FOR.

INTERNATIONAL BUREAU OF WEIGHTS AND MEASURES. See METRIC SYSTEM.

INTERNATIONAL CANDLE. See CANDLE AND CANDLE POWER.

INTERNATIONAL CODE. See SIGNALING AND SIGNALS.

INTERNATIONAL COPYRIGHT. See COPYRIGHT IN THE UNITED STATES.

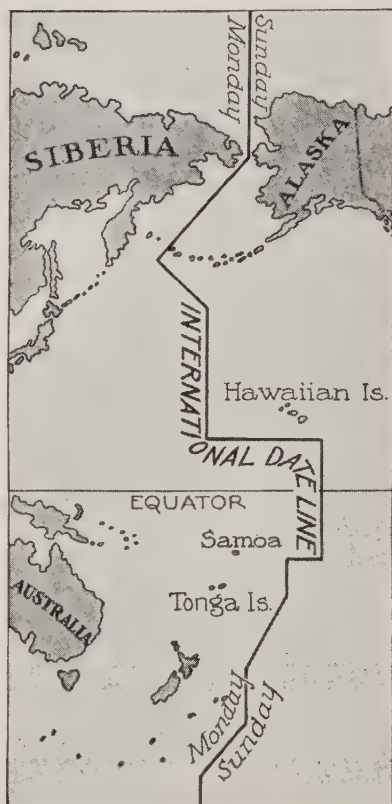
INTERNATIONAL COURT. See PERMANENT COURT OF INTERNATIONAL JUSTICE.

INTERNATIONAL DATE LINE, an imaginary line, extending from pole to pole, and drawn, except for slight variations, at the 180th meridian of longitude, or halfway around the world from the "given meridian" at Greenwich. It marks the place on the globe from which the beginning of each new day is reckoned.

If a person could leave New York at noon on Saturday and travel westward at a rate uniform with that of the apparent motion of the sun, he would travel fifteen degrees in one hour, and at the end of twenty-four hours he would have circled the globe. According to unbroken local time, wherever he happened to be it would still be noon on

Saturday, for everywhere he went the sun would continue to stand directly overhead; but according to the time in New York at the end of his journey, it would be noon on Sunday. Thus the traveler would have lost a day, because the earth, relative to his position, would have made no rotation. On the contrary, a traveler going eastward at the same rate would gain a day, for the earth would have made two rotations. If two people, starting from the same point, travel in opposite directions around the earth, their reckoning of time would differ by two days.

As confusion would be endless if the reckoning of time were unbroken around the earth, it was necessary to choose a point at which the date should change automatically. The meridian of 180° longitude was chosen for the reason that it lies nearly in the middle of the Pacific Ocean, far from civilized countries, and that it is exactly halfway around the world from Greenwich. The theoretical date line is



INTERNATIONAL DATE LINE

therefore this 180th meridian, but in practice it is more convenient to deviate slightly from the meridian, to avoid division of time in countries or islands. Thus the northeastern corner of Siberia, though nearly 15° east of the 180th meridian, lies west of the date line agreed upon. Similarly, Samoa and part of the Aleutian Islands, though west of 180°, are east of the date line. If the date line were drawn exactly north and south, local difficulties might arise—in some island the day might be Tuesday to one man and Monday with his neighbor; so the line is deflected wherever convenient.

The international date line has never been drawn by legal agreement among the nations, but general practice has determined its location.

INTERNATIONAL FIXED CALENDAR. See CALENDAR (Shall the Calendar Be Changed Again?).

INTERNATIONAL INSTITUTE OF AGRICULTURE, an organization located at Rome, Italy, which was founded for the purpose of recording and publishing statistical, technical, and economic information with regard to farming throughout the world. The idea for such an organization originated with an American, David Lubin, who, failing to interest his own government, found King Victor Emmanuel III, of Italy, enthusiastic and willing to give both financial and moral support to the undertaking. The Institute was established in 1905, with forty different countries represented. A beautiful palace was erected by the Italian government as a home for the organization. A permanent committee of delegates, living at Rome, acts as the administrative body, and a general assembly, made up of representatives of seventy-three affiliated nations, meets every two years to decide matters of policy. The detailed work is divided among four departments, or offices: the administrative department, entrusted also with the section of agricultural legislation and the library of about 170,000 volumes, pamphlets, and periodicals; the bureau of general statistics; the bureau of agricultural science; and the bureau of economic and social questions.

It is the purpose of the Institute to collect all possible data on the progress of the crops, acreage planted, droughts, disease, and other factors which might affect the world's food supply. Results of researches, new methods, improvements, studies in farm economics, and agricultural news of general interest are all published and distributed. Every effort is made to avoid all delay in issuing the bulletins, and the nations subscribing to this Institute cooperate by cabling frequent reports, as complete as possible, especially before, during, and after harvests.

INTERNATIONALISM, a world idea. See INTERNATIONAL RELATIONS.

INTERNATIONAL LANGUAGE. See LANGUAGES OF THE WORLD; ESPERANTO; VOLAPÜK.

INTERNATIONAL LAW, also called the LAW OF NATIONS, embraces those rules which independent states observe or are expected to observe in their conduct toward one another. In other words, the law of nations is *that collection of usages which civilized nations have agreed to observe in their relations with each other*. International law deals with independent and sovereign states, just as municipal law deals with individuals. But there are several important differences between international and municipal laws. International law is not made by any legislative authority; it is not interpreted by any established judicial body; and, more than that, it cannot be enforced by a superior power. It is based, first of all, upon common conceptions of right and justice, and then upon a set of definite treaties and conventions concluded between the nations of the world. It contains a set of rules and customs which have no other binding force than the consent of those who obey it.

But the voluntary declaration by the states of their intention to comply with the rules, and the fact that well-established rules are observed, show that international law does possess a binding character. The fact that states which break any of the accepted rules try to explain that their conduct is in accordance with international law also shows the binding character it has acquired.

Sources of International Law. International law is of recent origin and is the result of the growing belief that principles of humanity ought to govern relations between the nations. Treaties and agreements between states are among the principal sources of international law. The usual method followed now is to hold conferences to which the various powers send delegates. The first of these conferences was held at Paris in 1856, and its decisions, called the *Declaration of Paris*, were the first step toward the codification of the rules of international law. This was followed by the Geneva Convention, held in 1864. But the great work of putting into writing and codifying the rules that had been floating as unwritten law in the consciences of the civilized nations was undertaken by the two conferences held at The Hague in 1899 and 1907. The last great codification of international law was accomplished at the London Naval Conference held in 1909, which formulated the so-called *Declaration of London*.

General Aspects of International Law. International law deals with sovereign states. Each state has certain rights and duties, which are recognized by the other states, and the

mutual recognition of these rights and duties forms the basis of international law. Among the chief rights of a sovereign state are independence, equality with other states, determination of its own form of government, and absolute and exclusive jurisdiction over its own territory and over its own resident citizens. One of the chief rights of sovereign states is the freedom of navigation on the high seas, which means that the high seas are free to merchant ships and war vessels of all states. The sea which washes the coast of a state is, to the extent of three miles from shore, considered to be a part of the territory of that state. This forms what is known as the territorial waters.

Among the duties of a sovereign state are respect for the rights of other states; the maintenance of an orderly and efficient government; good faith in its dealings with other states; and compliance with the generally accepted rules of international law. One of the oldest canons of international law is that relating to ambassadors and other representatives sent by one state to another. The persons of such representatives are held sacred and inviolable, and the same restriction applies to their official residence and offices. Their families, official suite, and their property also enjoy special privileges (see EXTERRITORIALITY).

International Law in War. War profoundly modifies and changes the usual relations between the nations. The contending parties in war are known as *belligerents*, and other states are known as *neutrals*. Treaties existing between belligerents are usually abrogated or suspended during war, except as regards articles concerning the conduct of war. The possible areas over which operations are permissible are the territories of the belligerent states and the high seas.

The principles of international law ought to be strictly observed, if ever, in time of war, but violations of its provisions were so grave in the World War that statesmen were for a time forced to the conclusion that international law should be defined as the rules governing national relations in peace times. To solidify sentiment and make it hereafter practically impossible for any country to flout international law during war, a conference has been proposed to restate its principles relative to open hostilities.

War on Land. We give below some of the rules framed by the various international conferences for the conduct of warfare on land between civilized nations. Belligerents are forbidden to use poison or poison weapons; to kill or wound through treachery or after an enemy has laid down his arms and surrendered; to declare that no quarter will be given; to employ weapons, projectiles, or substances of such a nature as to cause unnecessary pain; to

make improper use of the flag of truce, national flag, or the badge of the Red Cross; to seize or destroy enemy's property except when actually necessary; to bombard undefended towns; to give up a city or place to pillage, sack, or plunder, even if taken by assault; to bombard buildings devoted to the care of the sick or wounded, religious worship, art, science, charity, and historical buildings and monuments, provided they are not used for military purposes. Nearly all of these humane provisions were repeatedly violated by the belligerents in the World War.

Enemy's troops which surrender or are captured are prisoners of war. Prisoners of war must be treated humanely and must be given as good food, beds, and clothing as are given the troops of the captor. The cost of keeping prisoners is to be repaid by their governments at the end of the war. Sick and wounded are to be cared for in accordance with the rules of the Geneva Convention.

In time of war, there is occasionally intercourse between the belligerents, which should be held sacred. Such intercourse includes the interchange of prisoners, the temporary suspension of hostilities, the passage of flags of truce, and the engaging in treaties of capitulation.

A war is terminated either by treaty or conquest. The latter must be complete before it is regarded as effective, and it must be accomplished by a proclamation of annexation, if territory is retained. After a conquest the conqueror succeeds to all the liabilities of the conquered.

War at Sea. The area in which naval operations may take place comprises the high seas and the territorial waters of the belligerents. The objects sought in naval warfare are the capture and destruction of the naval and military forces of the enemy, and of his sea-borne trade; and also the protection of the nautical territory and its sea-borne trade.

Below are given some of the rules which belligerents have been pledged to observe in the prosecution of naval warfare. Most of them are found in the Declaration of London in 1909. Enemy warships may be captured outside of neutral waters, and the vessel is a prize of war, no prize-court proceedings being necessary; vessels owned by citizens of belligerent states are subject to capture as enemy property; the enemy's goods on an enemy's vessel are also subject to capture, but not enemy's goods on a neutral vessel. After a merchant vessel has been captured, it must be brought before a prize court to determine whether it ought to be rightfully captured and condemned. Belligerent vessels of war have the right to visit and search all private vessels, belligerent or neutral, in order to determine whether

they carry goods that are contraband of war. Belligerents have the right to *blockade* the ports of their enemies and to stop all trade through these ports. The vessel which attempts to enter or leave a blockaded port is subject to capture, and to confiscation after it has been brought before a prize court.

Neutral States During War. During war, neutral states must abstain from doing anything which may be considered an unfriendly act by any of the belligerents. Neutral states must not permit the use of their territory by belligerents nor aid belligerents in their warlike operations. But a neutral state is not called upon to prevent the export or transport of arms, munitions of war, or, in general, of anything which can be of use to an army or a fleet. Neutral states must not permit belligerents' war vessels to remain in one of their ports more than twenty-four hours, except on account of damage or stress of weather. If a war vessel refuses to leave, it may be seized, held until the war is over, and its officers and crew detained. A belligerent vessel of war may take, in a neutral port, only sufficient supplies of fuel and provisions to enable it to reach a port of its own country. A prize may be brought into a neutral port, on account of unseaworthiness, stress of weather, or want of fuel or provisions, but must leave as soon as circumstances justifying its entry are at an end. If it refuses to leave, the neutral power must seize it, release its officers and crew, and intern the prize crew.

Since all nations have an equal right to the freedom of the seas, no belligerent can interfere with, interrupt, or render dangerous the operations of neutral trade on the high seas when carried on in accordance with international law. At the same time, neutrals cannot restrict the lawful operations of belligerents. But during the World War, fierce controversies raged between neutrals and some of the belligerents on account of many acts committed by the latter. The sowing of mines on the high seas along routes taken by commercial vessels, and the use of submarines for attacks without warning on merchant vessels carrying cargo and passengers, were among the chief subjects of complaint between neutrals and belligerents, and caused severance of diplomatic relations and finally war between Germany and the United States. E.D.F.

Related Subjects. The reader will find supplementary information in the following articles in these volumes:

Blockade	Peace Conference,
Geneva Convention	International
Law	Red Cross Societies
Neutrality	War
	World War

INTERNATIONAL NEWS SERVICE, a news-gathering association, organized by and serving the group of daily newspapers owned

by William Randolph Hearst (which see). See, also, ASSOCIATED PRESS.

INTERNATIONAL ORDER OF GOOD TEMPLARS. See GOOD TEMPLARS, INTERNATIONAL ORDER OF.

INTERNATIONAL PEACE CONFERENCE. See PEACE CONFERENCE, INTERNATIONAL.

INTERNATIONAL POSTAL UNION. See POSTAL UNION, INTERNATIONAL.

INTERNATIONAL RELATIONS. In 1914 the cannon's roar announced the beginning of a struggle that involved nations of every continent and caused an unprecedented loss of life and property. During that struggle, most aptly called the World War, the peoples of all lands had an opportunity to contrast two opposing world ideas which are to-day engaged in a bitter contest for supremacy. One of these ideas represents an exaggerated *nationalism* that magnifies self-interest, seeks national expansion by conquest, and upholds war as a method of settling national disputes. The other idea exalts *international* coöperation, the arts of peace, and friendly arbitration of disagreements. This international spirit, which is not to be confused with the internationalism preached by Soviet Russia, is making headway in a world that has been brought up on wars, but the narrow spirit of nationalism is by no means dormant. In Europe, boundary conditions have tended to foster the latter idea, while in North America, the opposite is true.

European countries are small, with the exception of Russia. The Canadian provinces of Alberta and Saskatchewan, comprising a relatively small part of the Dominion, are together larger than France and Germany and all of the mainland of Italy. Texas is almost as large as Norway and Sweden; Spain is smaller than the states of Michigan, Ohio, Indiana, and Illinois. International boundaries in Europe, as might be expected, are frequently but short distances apart. These man-made dividing lines mark more than variations in political practices, for they separate peoples differing widely in language, in customs, in dress, and, indeed, in hopes and aspirations. There is little to bind the millions of one crowded country to the people of another; only the necessity of buying and selling among them to provide the essentials of life creates a feeling of interdependence.

All Europe contains only 3,850,000 square miles, including its islands, and its separate governments and languages are more than twenty in number. North America, above the Rio Grande, contains over 6,750,000 square miles, and this vast area, nearly twice as great as that of Europe, has but two central governments and but one dominant language. Jealousies may color the utterances of Europeans, yet, whatever they say openly, they

realize that the United States has been the world's inspiring example in free government; within the twentieth century, they are finding that Canada offers the same quality of peace, prosperity, and happiness, and essentially the same kind of democracy.

Had Abraham Lincoln consented to the secession of the Southern states; had he admitted that each state could at any moment, and on any plea, take its departure from the American Union, he would have given his consent to the complete rupture of the federation. The Southern states would have gone; the border states might have followed them; the Western states doubtless would not have long remained. Where the practice of secession, once commenced, would have ended, would be difficult to say. Petty republics would have covered the middle of the continent; each would have had its standing army; each would have had its standing feuds; each would have viewed its neighbors with suspicion; and the stronger would always have been ready for aggression. Canada, in consequence of such conditions, would in self-defense have been compelled to arm, and would always have had to keep a close watch upon the disunited and discordant powers to the south.

To-day, what do Europeans see in America that they must inevitably wish for themselves? That world idea which America offers to all the continents is a boundary line between two proud nations, four thousand miles from ocean to ocean, but across which, for more than a hundred years, neither nation ever has launched a menacing army or fired a hostile gun.

Grasp that idea. Measure that achievement. A thousand miles up the majestic Saint Lawrence; a thousand miles along the Great Lakes; a thousand miles across the open prairie; a thousand miles across a mighty mountain range—four thousand miles where nation meets nation, where sovereignty greets sovereignty, but with never a fortress, never a battleship, never a gun, never a sentry, never a guard. Thus are international relations fostered in America.

It is to the credit of European nations that serious efforts are being made to overcome the conditions that have hampered peace efforts in the past. There have been conferences held and treaties signed which are evidence of the growing spirit of international coöperation. These movements are discussed in these volumes in the articles listed below. E.D.F.

Related Subjects. The reader is referred in these volumes to the following articles:

Arbitration
Genoa Conference
League of Nations
Locarno Agreement
Peace Conference,
International

Interparliamentary
Union
Permanent Court of
International Justice
Renunciation of War
War Debts

INTERNATIONAL SETTLEMENTS, BANK FOR, an institution created to administer the reparation payments for the liquidation of the World War debts, and to handle the details of the international finances involved. It is a part of the plan drafted by the reparation conference headed by Owen D. Young, and signed in Paris June 7, 1929. Through this bank, the payments of the war debts are received and distributed to the creditor countries in their assigned proportions. The seven interested countries, which control fifty-five per cent of the shares and bear the brunt of management and responsibility, are the United States, Great Britain, Italy, France, Germany, Belgium, and Japan. Other countries having a gold standard for their currency may subscribe for forty-four per cent of the stock, with a maximum of \$4,000,000 for each country. The original capital of the bank was set at \$100,000,000, one-fourth of which was paid in the beginning, each of the seven interested countries subscribing about \$3,570,000. The shares do not carry voting privileges, but they are registered and are negotiable.

The bank is controlled by able financial and business men, who manage it without political interference. The administration is in the hands of a board of directors of not more than twenty-five members. Heads of central banks of the seven principal countries (except the Federal Reserve Bank for the United States) are directors *ex officio*, and each appoints one additional director, though France and Germany may both have two directors to represent industry and commerce, as long as Germany pays annuities. These sixteen directors may appoint nine others from the candidates of the outside countries owning shares. The voting power of a director is in proportion to the shares owned in his country, and a majority is necessary for ordinary decisions, while a two-thirds vote is required to change a statute or to carry an extraordinary measure. The directorate is continuous, and the term of a director is five years. The directors must reside in Europe; headquarters are at Basel, Switzerland.

The powers of the Bank for International Settlements are very comprehensive, making it a world bank of wide scope. Though instituted primarily to administer the finances of the reparation settlements, it is expected to become a permanent instrument, and to be a large factor in world peace and the stabilization of world trade. It is authorized to carry on all phases of banking work, and to deal with private banks that have foreign business. It may rediscount commercial paper and buy and sell gold, long-term securities, and bills of exchange, as well as issue bonds. The profits are to be distributed according to definite specifications, which require certain percentages to be paid out as earnings on shares, and part

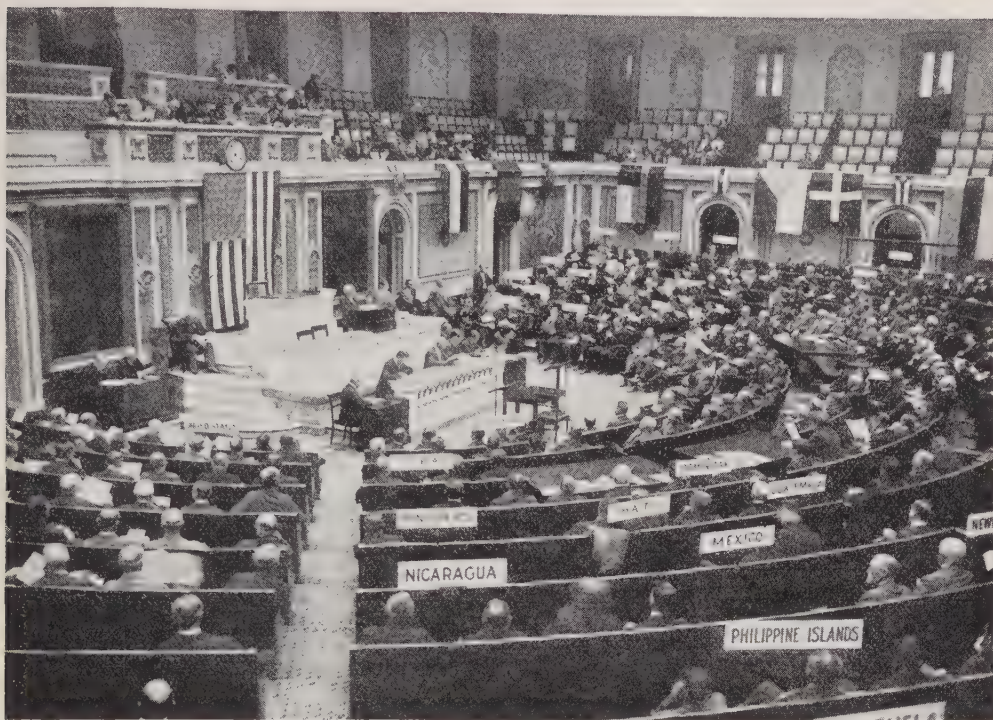


Photo: U & U

A SESSION OF THE INTERPARLIAMENTARY UNION

During the twenty-third congress of the Union, held in Washington, D. C., in the hall of the House of Representatives.

to be retired into a reserve fund; after certain reserves are satisfied, Germany may use a percentage of the remainder to pay the last annuities. See WAR DEBTS.

INTERNATIONAL YOUNG MEN'S CHRISTIAN ASSOCIATION COLLEGE. See MASSACHUSETTS (Education).

INTERNES. See HOSPITAL.

INTERNUNCIOS, *in tur nun' shih oze.* See NUNCIO.

INTERPARLIAMENTARY UNION. This great international association of the statesmen of all nations was organized in Paris in 1888. Its purpose is to aid in the settlement of disputes between nations by peaceful methods. It is not an official organization in the sense that the members are able to commit their governments to any course of action; its value lies in the "mingling of the mighty" and in the opportunities offered for the unofficial exchange of thought on the intricate problems ever present in national life.

Any member of a national Parliament or Congress, man or woman, is eligible to membership in the Union; it is not a body of elected or appointed delegates. Any person once admitted to membership on his credentials as a legislator is privileged to remain a mem-

ber, at his option, even after he has ceased to be a national legislator.

Annual meetings have been held in the various capitals of Europe and America since 1889, except in the years when international conflicts were in progress. At first, the United States did not send delegates to the conferences, but since 1897 its representatives have been present and have participated fully in the deliberations.

The programs for the meetings are prepared by a committee consisting of two representatives of each nation. The questions discussed include reduction of armaments, arbitration treaties, a permanent international tribunal, customs duties, passport regulations, international transportation, and problems of health and finance.

By free discussion of these problems, men are arriving at a common understanding, and are assuredly blazing the way for peaceful relations. Members of the Union meet as individuals, and because they speak as individuals, not under orders from governments as to what they shall say, they are not responsible to anybody for their utterances. Such freedom must necessarily reflect public opinion and the real feelings of men who, for the moment, are able to forget that they are politicians.

At the Washington meeting in 1925, a number of the Latin-American states were represented for the first time; fourteen of the twenty American republics, North and South, sent delegates from their legislative assemblies.

[Once previously, the Interparliamentary Union held its sessions in the United States. During the World's Fair in Saint Louis, in 1904, that city was host to the Union. On that occasion it adopted a resolution requesting President Roosevelt to call a second Hague Peace Conference; he set the political machinery in motion, and it was held in 1907.]

INTERROGATION POINT. See PUNCTUATION.

INTERROGATIVE PRONOUN. See PRONOUN, subhead.

INTERROGATIVE SENTENCE. See SENTENCE (Classification).

INTERRUPTER. See INDUCTION COIL.

INTERSTATE COMMERCE ACT, a measure passed by the United States Congress in 1887 to regulate commerce between the states of the American Union. It was demanded as a means to check abuses which had developed from the nation's lack of system in controlling private enterprises which existed solely to serve the public. In many other countries, governments either own the railroads and various other public utilities or exercise arbitrary authority over them; the policy of the United States formerly gave to individuals absolute control of what their capital produced.

After the War of Secession, the rapid growth of commerce between the states, the almost incredible increase in railway mileage, and the utter dependence of all communities upon railway facilities led to the possibility of abuses. Through a system of rebates of a portion of freight charges, the large shipper could put his goods upon the market at less cost than the competitor who paid full freight rates; shipping facilities could be extended to one and withheld from another; higher rates for short than for long hauls could be exacted; and pooling agreements between roads were possible. Individual states had passed restrictive laws to correct such of these tendencies as they could reach, but their authority could not be exercised beyond state lines; their legislation could not affect interstate traffic.

Several attempts at correction had been made in Congress, but without result until 1886, when a Congressional committee again investigated the entire field of common carriers and recommended the passage of a law to regulate interstate traffic. The next year, 1887, the Interstate Commerce Act was passed, and, with several later amendments, it has been the means of such fair regulation of commerce that transportation companies and other interstate corporations, once openly opposed to the law, are now, with rare exceptions, working in

complete harmony with those who administer it. For nearly twenty years, its administration was discouragingly weak because of lack of sufficient power and authority back of the statute, but sundry amendments have remedied these defects. Some of the distinctive features of the act in its present form are the following:

(1) The operation of the law is in the hands of the Interstate Commerce Commission (see below).

(2) Amendments in 1896 extended the scope of the law so that it covers all common carriers, such as sleeping-car companies, telegraph, cable, and telephone companies, express companies, and pipe lines. Only railroads were embraced in the original act.

(3) Higher proportionate rates cannot be charged for a short distance than for a long haul, except in unusual cases, and then only by permission, publicly justified.

(4) Any agreement between carriers which provides for pooling of traffic and division of profits is illegal.

(5) All rates are to be made public before becoming effective, and are not to be changed without permission. If the Commission believes any rate is too high, it may arbitrarily reduce that rate, but its action is subject to review by the courts, to insure justice.

(6) Rebating is made punishable by fines, as is false billing of freight; any officer who shall do anything declared to be illegal, or who shall fail to do anything required by the Commission, shall be fined or imprisoned.

(7) The Commission has power to prescribe uniform methods of accounting, and its employees are given access to the books of record of any company on demand.

(8) The number of working hours per day on common carriers is limited to eight.

(9) Offenses against any provision of the act are misdemeanors.

Interstate Commerce Commission. To enforce the provisions of the Interstate Commerce Act, a permanent commission of five members was created; this was increased to seven, then to nine, and later to eleven. The members are appointed for seven years by the President with the approval of the Senate, and are prohibited from engaging in any other business or employment during their terms of office. The member whose term first expires usually is chairman of the Commission. The salary is \$10,000 per year.

The Commission has extensive power to inquire into the affairs of all carriers excepting autobus and motor truck companies, in interstate business. The traffic under its observation is enormous, the railroads carrying over 5,000,000,000 tons of freight and about 950,000,000 passengers each year, on more than 250,000 miles of rails; this is but one side of the Commission's interests, although the most important. During a year, about a thousand formal complaints respecting the manner in which the country's immense volume of interstate business is transacted are filed with the Commission. All of these are made public as

soon as filed. Much of the time of the Commission is consumed in the interpretation of interstate-commerce laws. A court will not recognize a case until legal action has been commenced on it, but the Interstate Commerce Commission is always ready to make rulings on cases which might possibly arise, and thus interested parties learn in advance what the Commission believes it is legal for them to do. The Commission is required to report to the Attorney-General of the United States all cases that come to its notice of violations of criminal sections of the interstate-commerce laws.

A special judicial tribunal, the United States Commerce Court, was established in 1910 as an auxiliary to the Interstate Commerce Commission, but this was abolished by act of Congress in 1913, and its jurisdiction was transferred to the United States District Courts. See RAILROAD.

INTERSTATE COMMERCE COMMISSION. See preceding article.

INTERVALS. See MUSIC (A Lesson in Harmony).

INTERVENTION, the forceful interference of a nation in the internal affairs of another sovereign state. This phase of international relations is illustrated by the action of the United States government in April, 1898, when, in the interest of humanity, it made a formal demand on Spain to withdraw its troops from the island of Cuba, then in insurrection [see CUBA (History)]. According to international law, a state may intervene in the concerns of another whenever the latter is conducting its affairs in such a way as to threaten the peace and safety or to injure the property and persons of citizens of the intervening state. By many authorities it is believed that intervention is also justified on moral grounds, such as the prevention of useless bloodshed.

INTESTACY, *in tes' ta sie*, in law, the state or condition of dying without leaving a will, or of leaving a will that has such defects as to render it illegal. The person is said in that case *to die intestate*, and his property descends to his lawful heirs. In the United States, the effect of intestacy varies in accordance with the inheritance laws, which differ in the several states; but in Canada and Great Britain, it does not affect real estate, which is disposed of by the rule of descent.

Related Subjects. The reader is referred to the following articles in these volumes:

Heir	Real Estate
Personal Property	Will

INTESTINAL INDIGESTION. See DYSPEPSIA.

INTESTINE, *in tes' tin*, the muscular, hose-like tube through which food is conveyed from the lower end of the stomach to the point of outlet. The intestinal tract is divided into

two portions, a large and a small intestine, the division being based on diameter, not on length of the parts.

Small Intestine. This section runs from the stomach a distance of about twenty feet to the point where it empties into the large intestine. It is doubled up into an apparently shapeless mass, but is, nevertheless, held in the same relative position throughout life, and carries on the main part of digestion, this process being only begun by the stomach. In its upper part, it mixes the juice from the liver and pancreas with its own secretion. These juices contain substances known as *enzymes*. There is an enzyme for each type of food we eat, carbohydrate, protein, and fat, and by means of their activity our food is digested for us. No one knows the exact structure of these enzymes, but they are believed to be chemical substances. Muscular contractions of the intestines propel the contents along by successive movements called *vermicular*, or *like the movement of a worm*. In the small intestine, the food is changed to a liquid form from which the nutritive elements are absorbed by blood vessels and lacteals. The lacteals, which carry fat, originate in minute finger-like projections on the mucous membrane, the inner lining of the tube. These projections are called *villi*.

Large Intestine. The large intestine is about five feet long, and is less crooked than the small. The *caecum* is a blind, pouchlike piece of the large intestine, about six centimeters in length, which hangs down from the point of junction of the small and large intestines. From the caecum projects a hollow, finger-like tube, blind at one end, called the *vermiform appendix*. On the right side of the abdominal cavity, where the small intestine opens into the large, begins that portion of the large intestine known as the *colon*. This extends upward (*ascending colon*), then across the middle line below the stomach (*transverse colon*), and then passes downward on the left (*descending colon*). It finally makes an S-shaped turn in the lower left side of the abdomen, ending in a narrow tube called the *rectum*. It is through the rectum that solid waste matter is expelled.

The large intestine is an important cleansing organ for the entire body, since through it waste products are eliminated, and it is therefore necessary to keep it in an active condition. When its movements become sluggish, producing constipation, waste matter accumulates in the body, and this condition may bring on serious diseases. By exercising, drinking plenty of pure water, eating freely of fresh fruits and vegetables, and establishing regular habits, one can usually avoid this common ailment. Bran bread or muffins are often helpful in overcoming constipation, since they supply rough-

age. A certain amount of food to supply roughage alone should always be included in the diet. The most stubborn cases will usually yield to the regular use of pure mineral oil. This oil has none of the objectionable features of patent laxatives, which afford temporary relief but at the same time aggravate the malady.

K.A.E.

Diseases. Among the diseases whose seat of activity is the intestinal tract are typhoid fever, cholera, cancer, ulcers from various causes, and hookworm. Each of these is treated in these volumes under its proper heading. Intestinal disturbances are frequently the cause of dyspepsia. Appendicitis (which see) is caused by inflammation of the vermiform appendix.

Related Subjects. The reader is referred to the article ALIMENTARY CANAL for illustration of the intestines; see, also, DIGESTION (The Intestines); LACTEALS; VILLI.

INTOLERABLE ACTS, in American history, the name given to five measures passed by the British Parliament early in 1774, to punish the people of Massachusetts for their destruction of the tea sent into Boston Harbor in December, 1773. These laws were as follows:

(1) The first, called the Boston Port Bill, ordered the port of Boston to be closed until the people paid for the tea they had destroyed. The customhouse was removed to Marblehead.

(2) The second provided that any officer or soldier of the Crown who was arrested for murder should be sent to England for trial.

(3) The third act changed the charter of Massachusetts, made provision for a military governor, and forbade the people to meet in public assembly without the governor's permission, except for the purpose of electing officers.

(4) The fourth law required the colonists to furnish the soldiers who were quartered among them with shelter, firewood, drink, bedding, soap, and candles.

(5) The fifth, called the Quebec Act, extended the Province of Quebec southward to the Ohio, and granted freedom of worship to Roman Catholics in the province.

The Five Intolerable Acts only served to unite the thirteen colonies for the common defense of their liberties, and they therefore hastened the outbreak of the Revolutionary War.

Related Subjects. The reader will find additional information of importance in the following articles:

Boston Port Bill	Quebec Act
Boston Tea Party	Revolutionary War

INTRADOS, *in tra' dahs*. See ARCH.

INTRANSITIVE VERB. See VERB (Classes).

INTRODUCED SPECIES, a term applied to animals carried from their native lands to distant places where previously they had not been known. There are many conspicuous examples. The bumblebee was introduced into Australia and New Zealand for a purpose (see page 679). The rabbit was carried to Australia for the sport of hunters; in a few years it was a pest, and its destruction was ordered.

The mongoose was taken to Jamaica to rid the island of rats, but within a few years its depredations among fowls made it a menace.

INTUITION, a so-called "sixth sense," is the ability to discern and to know without conscious attention or previous information or experience. In other words, it is a faculty not dependent upon reasoning processes or logic, but is an instinctive knowledge or feeling from within that seems to be psychic in its nature. Women are supposed to be more intuitive than men, and with the former, intuition often seems to take the place of reasoning. "I just know," is a frequent answer when a woman is asked for the reasons upon which she has based a conclusion. Most psychologists do not believe in intuition as anything but a quickly drawn conclusion based upon forgotten experience, knowledge, or sense impressions. They sometimes have called it "insight," or knowledge stored within the subconscious, and drawn upon at will.

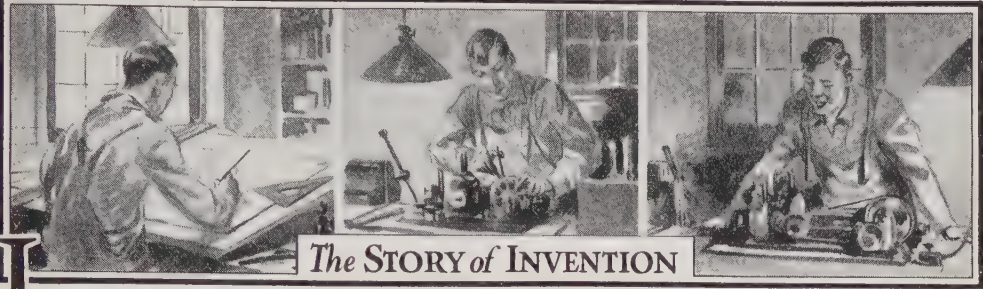
When a habit becomes automatic, it ceases to be a habit, because it is submerged within and becomes involuntary in action. So the impressions made by each of the five senses may be stored up within the unconscious self, to be drawn upon later, sometimes in a most unexpected manner. It may be association of memory that calls them forth, but whatever it is, many psychologists attribute all human action and feeling to physical causes, ignoring everything of a psychic nature. Such psychologists are known as *behaviorists*. While both the intellect and the emotions are thought by them to be the product of nervous and muscular tension, intuition is sometimes so spontaneous, and apparently so free from outward stimulus, or from forgotten memory or experience, that it defies the analysis of the behavioristic psychologist. See INSTINCT.

INULIN, *in' yu lin*. See BIOCHEMISTRY (Photosynthesis).

INVALIDES, *HÔTEL DES, aN vah leed', o-tel' daze*, a home for disabled and needy soldiers of France. With its fine location on the Seine, it is one of the most imposing structures in Paris, but is of particular interest because it contains the tomb of Napoleon I. Under a massive dome is a crypt containing the sarcophagus, hewn from a huge block of Russian granite. The ashes of the "Little Corporal" were deposited here in 1840. The building was erected by Louis XIV in 1670, and now has accommodation for 6,000 inmates; the institution has been maintained by the nation since 1832. To be entitled to its privileges, a soldier must have served ten years in the army of the republic, and he must be suffering from poverty or infirmity.

[The name means *home of the infirm*.]

INVAR, *in vahr'*. See NICKEL.



INVENTION. Boys and girls of to-day, and their fathers and mothers, too, seldom give a thought to the source of the vast number of modern conveniences they enjoy and could not well do without. The wonderful facilities at their command are accepted as a matter of course. The civilized world is advancing at such a wonderful rate that we fail to realize that the commonplace of to-day was unheard of only a short time ago. People only a little past middle age can remember when they first saw a telephone. It was a wonder to them that they could talk a dozen miles and hear the familiar tones of a friend's voice above the sputtering and crackling of those first undeveloped instruments. Pictures which show movement and which have sound effects have become familiar to everybody. And we now have radio, with which, easily and without connecting wires, we instantly hear voices a thousand miles away!

When They Were Boys and Girls. To read a list of common things that our fathers and mothers knew little or nothing about when they were young will emphasize the recent progress of the world. Only a few can be named here; it will be a valuable exercise to add to the list:

Adding machines,	Player pianos,
Airplanes,	Pneumatic tires,
Aluminum kitchen ware,	Pulmotors,
Automatic telephones,	Recording telephones,
Automobiles,	Safety razors,
Cash register,	Sending pictures by
Concrete buildings,	telegraph,
Cotton-picking machines,	Steel trains,
Cream separators,	Stock ticker,
Electric furnaces,	Submarines,
Electric stoves,	Talking machines,
Electric welders,	Talking moving pictures,
Fireless cookers,	Thermos bottles,
Gas mantles,	Tractors,
Hydroplanes,	Turbines,
Kodak films,	Type-setting machines,
Liquid soap,	Vacuum cleaners,
Mechanical stokers,	Vestibuled cars,
Motorcycles,	Wireless telegraph,
Moving pictures,	Wireless telephone,
Oil-electric locomotives,	Wireless torpedoes,
Periscopes,	Zeppelins.

boys and girls, most of these things were practically unknown:

Acetylene,	Hydraulic elevators,
Air brakes,	Ice machines,
Arc lamps,	Paraffin paper,
Artificial silk,	Phonographs,
Block signals,	Process color-printing,
Carpet sweepers,	Portland cement,
Celluloid,	Rubber tires,
Color photography,	Shoe-sewing machines,
Dynamite,	Skyscrapers,
Dynamos,	Sleeping cars,
Electric light,	Steel boiler plates,
Electric motors,	Steel ships,
Electric railways,	Storage batteries,
Elevated railways,	Submarine cables,
Fountain pens,	Telephones,
Gas engines,	Television,
Gasoline,	X-Ray machines.

It is but a short period, as time is counted, back to the days of the great-grandparents. Those good people really enjoyed life, but besides being without the common things named above, they knew nothing about the articles named below:

Bessemer steel,	Prepared paint,
Bicycles,	Railroads,
Binders,	Ready-made clothing,
Corn planters,	Reapers,
Cylinder printing presses,	Screw propellers,
Daguerreotypes,	Sewing machines,
Electromagnets,	Steel rails,
Galvanized iron,	Telegrams,
Hard rubber,	Threshers,
Matches,	Typewriters,
Mercerized cotton,	Vulcanized rubber,
Photographic negatives,	Wire nails.
Postage stamps,	

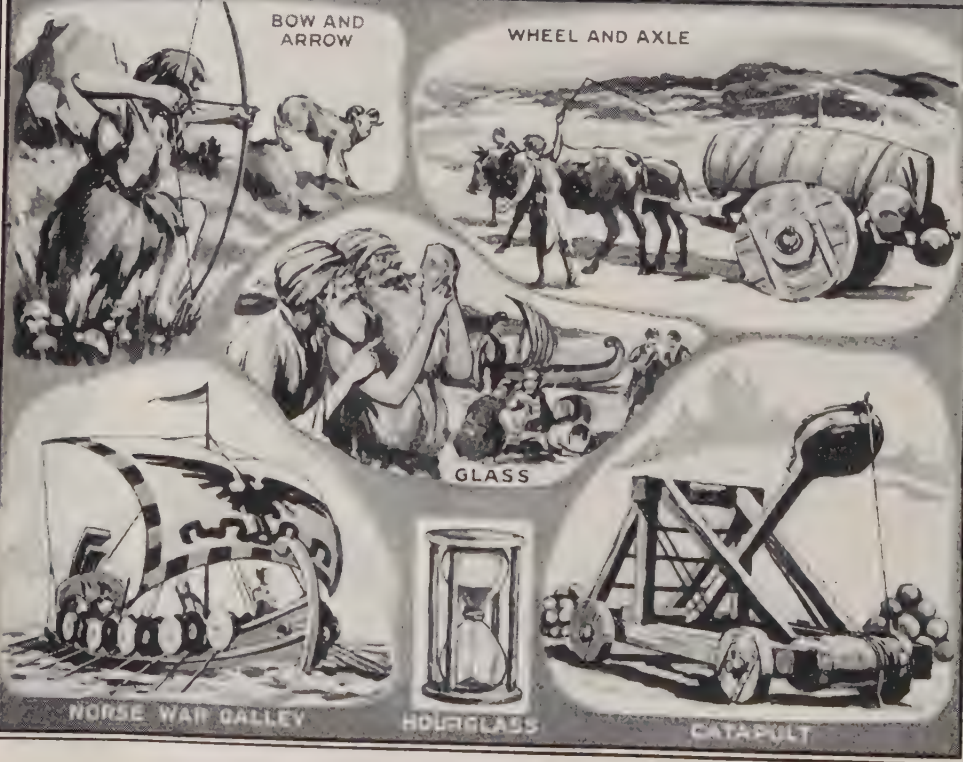
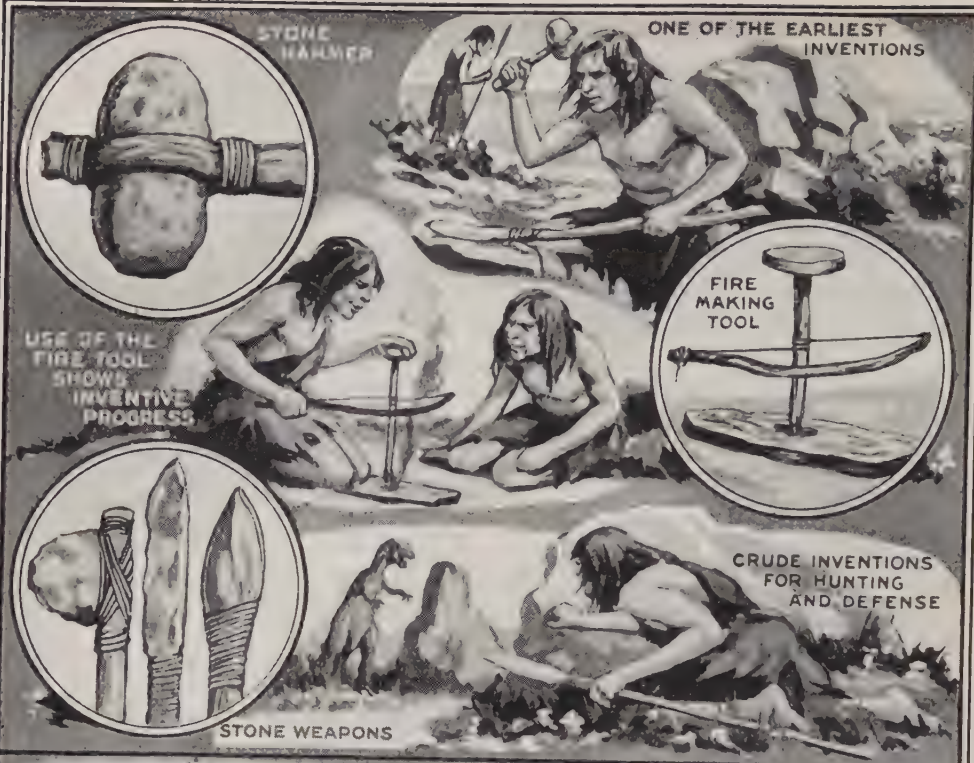
Inventions. All of the above are *inventions*—the result of man's ambition to produce something to lessen his work, to make a thing that would increase his comfort, to give to the world that which might possibly bring him fame and wealth.

An invention may be either an entirely new device by which certain work may be accomplished more easily than ever before, or it may consist merely in an improvement in one small part of an implement already in service.

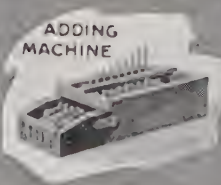
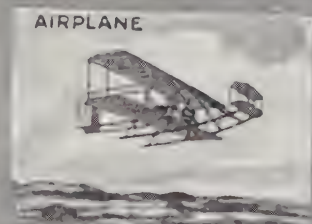
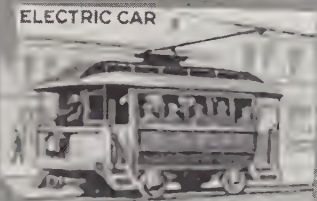
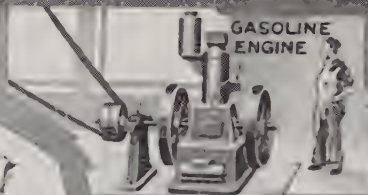
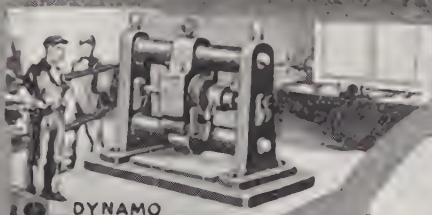
Invention keeps pace with civilization—indeed, which leads the other has often been

(Continued on page 3497.)

When grandfathers and grandmothers were







questioned. It has been said that "Necessity is the mother of invention." Men with investigating minds, possessed of the belief that certain new things were possible and were needed, have wrought for years to perfect many of the devices now ranking among the greatest of inventions. Very few inventions are the result of chance, although their underlying principles are sometimes disclosed by accident, as in the case of the Welsbach gas mantle and Goodyear's process for vulcanizing rubber. In such cases, nevertheless, it is almost always true that perfection has come only through years of hard work and study.

Seldom does one man conceive an invention and bring it to a finished state. There are frequently as many inventors as there are important parts of an article; the fountain pen is the inspiration of nearly a hundred men, whose work, part by part, has been discarded in favor of later improvements. Thomas A. Edison, who is the greatest inventor in the world's history, says that inventive genius is "two per cent inspiration and ninety-eight per cent perspiration."

Protection to Inventors. Whatever device a man may originate is his personal property; no other man has any right to use it for a long term of years except with the inventor's permission. Laws of all countries recognize this, and each nation guarantees to its citizens or subjects who produce inventions the *exclusive right* to all benefits that may be derived from

them. Such a guarantee is in writing, is issued by the government, and is called a *patent* (which see). An inventor may, under his patent, manufacture and sell his device; he may sell all his rights to others and thereafter reap no further benefits; he may contract to permit others to make and sell his invention, on an agreement that he shall be paid a certain sum on each sale.

A man who buys a plow purchases a patented article. When he pays for it, he gets not only the plow but the right to use it in any way he pleases; he may even sell it again, but he violates the law if he uses that plow as a pattern and makes another like it.

Progress of Invention. In the Bible there appears the phrase, "There is no new thing under the sun." The United States Patent Office officials in 1846 had nearly the same idea, for in that year half their small force was dismissed because it was believed almost everything had been patented that could possibly be invented. In that year, 566 patents were issued to citizens of the United States. The number increased year by year, however, and now between 45,000 and 50,000 patents are issued annually.

Modern Achievement. Following is a list of some of the great inventions of recent times, arranged in alphabetical order. An asterisk after the name of an inventor indicates that there has been provided a biography of him in these volumes.

INVENTOR	DATE	INVENTION	REMARKS
Woehler.....	1862	Acetylene process.....	Gave the world a valuable light.
Burroughs.....	1888	Adding machine.....	The first of the machine calculators, which have simplified office work.
Wright Brothers*.....	1903	Airplane.....	The dream of centuries, a man-made bird.
Westinghouse*.....	1869	Air brake.....	Made possible high-speed railway travel. Its efficiency has been doubled since 1890.
Fouche.....	1905	Autogenous welder.....	Very efficiently employs oxygen and acetylene.
Hall.....	1871	Automatic block signal.....	Made railways safer. The signals are worked by electric currents in the tracks.
Strowger.....	1889	Automatic telephone.....	Requires no central operator.
Montgolfier Brothers..	1783	Balloon.....	The first invention to carry men in the air.
Bessemer*.....	1855	Bessemer process.....	Shortened the process of steel-making 99 per cent.
Michaux.....	1855	Bicycle.....	Till the automobile, the greatest advance in road transportation.
Bunsen*.....	1855	Bunsen burner.....	Was the foundation of efficient gas-lighting.
Felt.....	1889	Calculating machines.....	Add and multiply, subtract and divide more rapidly than the brain can do these things.
Bissell.....	1876	Carpet sweeper.....	Saves work and prevents dust in millions of homes.
Patterson.....	1885	Cash register.....	Systematized and simplified the merchant's business.
Roberts.....	1907	Caterpillar tractor.....	Makes power-farming possible in very soft or rough ground.

INVENTOR	DATE	INVENTION	REMARKS
De Laval.....	1887	Centrifugal cream separator...	Saves farmers hundreds of millions of dollars.
Du Hauron.....	1869	Color photography.....	Will some day supersede black and white pictures.
Whitney*.....	1792	Cotton gin.....	Made possible the great growth of the American cotton industry.
MacArthur.....	1887	Cyanide process.....	Has enormously increased the world's output of gold.
Forrest Brothers.....		Cylinder printing press.....	Developed modern high-speed newspaper-printing.
Hoe*.....	1847		
Daguerre*.....	1839	Daguerreotype.....	Considered marvelous in its day.
Diesel.....	1900	Diesel motor.....	A successful internal-combustion engine.
Giffard.....	1852	Dirigible airship.....	An early predecessor of the famous Zeppelin.
Berliner*.....	1887	Disk records.....	The permanent phonograph records of today.
Nobel*.....	1867	Dynamite.....	The most useful explosive.
Brush.....	1878	Electric arc lamp.....	The first efficient street light.
Grounelle.....	1852	Electric automobile.....	With a modern storage battery this machine would have been a success.
Otis Co.....	1887	Electric elevator.....	Increased the height of buildings.
Heroult.....	1887	Electric furnace.....	Makes carborundum, the hardest manufactured substance; calcium carbide for acetylene; artificial diamonds. Has reduced the cost of aluminum over 97 per cent.
Edison*.....	1879	Electric light.....	The safest and most useful artificial light.
Stone.....	1902	Electric lighting for trains....	Makes it possible to light sleeping-car berths.
Pacinotti.....	1860	Electric motor.....	Harnessed the most wonderful known force.
Gramme.....			
Siemens.....	1879	Electric railway.....	Makes the modern city a unit and the farmer a suburbanite.
Halske.....			
Plante.....	1860	Electric storage battery.....	Now used in submarines and electric automobiles.
Thomson.....	1886	Electric welder.....	Joins metals previously unweldable.
Otis.....	1853	Elevator.....	Made modern skyscraper practical.
Otto.....	1876	Gas engine.....	Made automobiles and airplanes possible.
Pintsch.....	1891	Gas lighting for railway cars....	By compression of gas.
Welsbach*.....	1884	Gas mantle.....	Multiplied the efficiency of gas light.
Daimler.....	1890	Gasoline automobile.....	The greatest mechanical factor in social progress.
Rittman.....	1915	Gasoline-refining process.....	Gives several times the former amount of gasoline from petroleum.
Lilienthal.....	1890	Glider.....	The forerunner of the airplane.
Bohnenberger.....	1817	Gyroscope.....	Stabilizes airplanes, ships, and monorail cars.
Goodyear*.....	1851	Hard rubber.....	Used in fountain pens, telephone receivers, and other articles.
Otis Co.....	1872	Hydraulic elevator.....	Added speed and safety.
Beach.....	1869	Hydraulic tunneling shield....	Used in boring under rivers.
Curtiss*.....	1911	Hydroaeroplane.....	A flying machine which can come down either on land or water.
Carre.....	1860	Ice-making machinery.....	Gives ice to warm climates.
Tesla*.....	1888	Induction motor.....	Made possible to-day's extensive use of electric power.
Lamb.....	1866	Knitting machinery.....	Makes stockings without seams.
Heathcot.....	1809	Lace-making machine.....	Works faster and more cheaply than hand workers.
Mergenthaler.....	1888	Linotype.....	Sets type several times as fast as hand methods.
Lewis.....	1912	Machine gun.....	Combines ease of handling with strong, rapid, and continuous fire.
Walker.....	1837	Matches.....	Superseded the flint and more ancient methods of fire-making.
Phillips.....			

INVENTOR	DATE	INVENTION	REMARKS
Hulett.....	1898	Mechanical ore unloader.....	Reduced cost of handling ore, in some cases two-thirds.
(Several).....	1915	Mechanical stoker.....	Increases efficiency of railroad locomotives.
Mercer.....	1851	Mercerizing process.....	Makes cotton look like silk.
Edison*.....	1887	Moving picture.....	Brings amusement and education to millions daily.
Sprague.....	1901	Multiple-unit control.....	Makes any car the engine of a train.
Edison*.....	1878	Multiplex telegraph.....	Sends several messages over one wire at the same time.
Diesel.....	1893	Oil engine.....	Used in battleships and ocean liners.
Drake.....	1859	Oil wells.....	First sunk for kerosene, now more valuable for gasoline.
D'Albe.....	1913	Optophone.....	Makes the blind hear light.
Edison*.....	1877	Phonograph.....	Brings good music to thousands and is useful commercially.
Eastman*.....	1887	Photograph film.....	Makes it unnecessary to carry heavy apparatus.
Talbot.....	1839	Photographic negative.....	From which unlimited prints can be made.
Niepce.....	1827	Photography.....	The greatest of useful arts. Niepce's process required several hours' exposure.
White.....	1897	Piano player.....	Reproduces mechanically the playing of artists.
Radio Corporation of America.....	1924	Pictures by wireless.....	Provides for instantaneous transmission of pictures.
Dunlop.....	1890	Pneumatic tire.....	Takes the jolts and jars out of automobiling and bicycling.
Lürman.....	1862	Portland cement.....	A most important element in building.
Marconi.....	1895	Radio.....	See Wireless Telephone, next page.
Stephenson*.....	1833	Railroad locomotive.....	The greatest step in the history of transportation.
McCormick*.....	1831	Reaper.....	The first great farm labor-saver in history.
Monier.....	1867	Reinforced concrete.....	Originally intended for flowerpots, has become the material of skyscrapers.
Thevanon.....	1865	Rubber tires.....	Now used on auto-trucks, carriages, and electric vehicles.
Goodyear*.....	1840	Rubber vulcanizing.....	Made rubber one of the most useful substances.
Pasch.....	1844	Safety match.....	Now required by law in some countries.
Ericsson*.....	1839	Screw propeller.....	Increased the speed of ships.
Howe*.....	1846	Sewing machine.....	Made possible the factory system in clothes-making.
McKay.....	1860	Sewing machine for shoes.....	Revolutionized the shoe industry.
Pullman*.....	1864	Sleeping car.....	Suitable for both day and night travel.
Fulton*.....	1807	Steamboat.....	Reduced the time of crossing the ocean from weeks to five days, and made river navigation possible.
Watt*.....	1773	Steam engine.....	Has transformed the commercial world.
Parsons.....	1884	Steam turbine.....	Lowered cost of steam power; abolished pounding of steam engines.
Wood.....	1797	Steel plow.....	Farmers at first feared it would poison the soil.
Laws.....	1866	Stock ticker.....	A printing telegraph for the stock market.
Bushnell.....	1775	Submarine.....	Used by Americans in the Revolutionary War. The dreaded "scorpion of the seas" in the World War.
Field*.....	1866	Submarine cable.....	Joined all nations in instant communication.
Winans.....	1834	Swivel truck.....	Made long railroad cars practicable. They could turn on short curves.
Case.....	1927	Talking pictures.....	Makes it possible to hear as well as see the "movies."
Gray*.....	1890	Telautograph.....	Transmits drawings and writings by telegraph.
Morse*.....	1835	Telegraph.....	Annihilated distance in communication.
Bell*.....	1876	Telephone.....	"The most valuable American patent."

INVENTOR	DATE	INVENTION	REMARKS
Poulsen.....	1898	Telephonograph.....	A recording telephone.
Pedersen.....			
Baird.....	1927	Television.....	Makes it possible for two parties in a telephone conversation to see each other.
Roberts.....	1852	Thrasher.....	Made necessary by the huge crops following the invention of the reaper.
Van Depoele and Sprague.....	1884	Trolley car.....	Helped to make large cities.
Just & Hanaman....	1903	Tungsten light.....	Lasts longer, gives more light, uses less power.
Clerk.....	1879	Two-cycle gas engine.....	The type most used in motor boats.
Thurber.....	1843	Typewriter.....	Has almost supplanted handwriting in industry.
Sessions.....	1887	Vestibuled cars.....	Makes it safe to pass from car to car, and keeps out dirt.
Flowers.....	1913	Voice-controlled writing machine.....	Not yet perfected.
Bell*.....	1886	Wax removable records.....	Replaced Edison's tinfoil.
Tainter.....			
Tesla*.....	1898	Wireless-controlled boats and torpedoes.....	Can be steered from shore.
Marconi*.....	1895	Wireless telegraph.....	Makes sea travel safer.
Bell Co. Engineers....	1915	Wireless telephone.....	Has carried the human voice half way 'round the world.
Roentgen*.....	1896	X-ray.....	Of inestimable value in medicine and surgery.

Some Old Inventions. In more remote times, there were many new devices whose stories have been recorded. Many of these old inven-

tions suggested ideas to modern minds. Of these articles, the following are perhaps the most important:

DATE	INVENTOR	INVENTION
B. C.		
Third century	Archimedes*	Compound pulley, and his screw for raising water, still used in Holland.
130	Hero	Steam engine.
First century		The Gauls employed a reaper. The Roman accounts of it suggested the modern machine.
A. D.		
717		The Greeks used gunpowder at the siege of Constantinople.
Tenth century	Pope Sylvester II	Pendulum clock.
1450	Gutenberg*	Printing with movable type.
1481	Branca	Canal locks, built by two brothers of Viterbo, Italy.
1629		Steam turbine.
1709	Cristofori	Pianoforte.
1738	Labelye	Caisson, for bridge building.
1742	Franklin*	Stove.
1764	Hargreave*	Spinning jenny, spun ten threads at once.
1767	Arkwright*	Spinning frame.

E. D. F.

INVERTASE, *in vur' tase*. See YEAST.
INVERTEBRATES, *in vur' te brayts*, OR **IN-VERTEBRATA**, *in vur te bra' tah*. These are, respectively, the common and the scientific names for that large group of animals which lack a vertebral spinal column, or backbone. In older zoölogical classifications, the vertebrate (backboned) animals comprised a major division, or subkingdom, of the animal world, and all other animals, called *invertebrates*, were divided into a varying number of sub-

kingdoms. Later researches in animal structure showed that vertebrate animals have evolved from lower forms possessing an elastic supporting rod of cells called the *notochord*, which appears in the embryo of the true vertebrate as a primitive spinal column. Hence vertebrates are now regarded as the highest division in a subkingdom, or phylum, which is given the name *Chordata*. Invertebrates, according to the usage adopted by most zoölogists, are all the animals below the

subphylum *Vertebrata*, but the lower chordates really form a connecting link between the vertebrates and invertebrates.

The invertebrate animals comprise all but about 36,000 species in an animal world embracing possibly 600,000 known forms. They include three subphyla of the phylum Chordata, and, in addition, such groups as the protozoans, sponges, polyps, worms, starfish and their allies, insects, crustaceans, spiders, centipedes, and mollusks. A standard classification of invertebrates is given in these volumes in the article ZOÖLOGY.

S.H.S.

Related Subjects. For descriptions of the most important invertebrate groups, the reader is referred to the following articles, and to the classifications indexed therewith:

Arthropoda	Porifera
Coelenterata	Protozoa
Echinoderms	Worms
Mollusks	

INVESTITURE, RIGHT OF. See GREGORY (VII, Popes).

INVISIBLE LIGHT. See ULTRA-VIOLET RAYS.

INVINCIBLE ARMADA. See ARMADA.

INVOLUNTARY ACTS. See REFLEX ACTION.

INVOLUNTARY MUSCLES. See MUSCLES.

INVOLUTION, *in volu' shun*, in mathematics, is the process of raising a number to any required power. By *power* is meant the product obtained by using the number two or more times as a factor. For example, 64, the product obtained by using 4 three times as a factor, is the *third power* of 4, since $4 \times 4 \times 4 = 64$. The power is indicated by a small figure, called an *exponent*, which is placed at the right of and a little above the number. Thus:

$3 \times 3 = 3^2 = 9$, the second power of 3.

$3 \times 3 \times 3 = 3^3 = 27$, the third power of 3.

$3 \times 3 \times 3 \times 3 = 3^4 = 81$, the fourth power of 3, etc.

The first power of a number is the number itself; thus $3 = 3^1$. When a number is taken twice as a factor, it is said to be *squared*; when taken three times, it is *cubed*. Also, the second power of any number is its square, and the third power its cube.

When a fraction is raised to any power, both the numerator and denominator must be raised to that power. For example, the fraction $\frac{3}{4}$ raised to the third power =

$$(\frac{3}{4})^3 = \frac{3 \times 3 \times 3}{4 \times 4 \times 4} = \frac{27}{64}.$$

The product of any two powers of a number may be found by adding the exponents and raising the number to the power indicated by the sum. Thus, $4^2 \times 4^3 = 4^{2+3}$, or 4^5 , or 1,024. Again, when it is required to raise a number with an exponent to any power, such as $(3^2)^3$, the exponents may be multiplied and the

product considered the exponent of the number to be raised. Thus, $(3^2)^3 = 3^{2 \times 3} = 3^6 = 729$. Any number, therefore, is raised to the sixth power when its square is cubed; likewise, cubing its cube raises it to the ninth power.

By the application of the following rule, the square of any number composed of two figures may be found:

The square of any number composed of two figures is equal to the square of the tens, plus twice the product of the tens and the units, plus the square of the units.

Square 35.

Process: $(35)^2 = 30^2 + 2(30 \times 5) + 5^2 = 900 + 2(150) + 25 = 900 + 300 + 25 = 1,225$.

A number consisting of two figures may be cubed by applying the following rule:

The cube of any number consisting of two figures is equal to the cube of the tens, plus three times the product of the tens squared and the units, plus three times the product of the tens and the units squared, plus the units cubed.

Cube 35.

Process: $(35)^3 = 30^3 + 3(30^2 \times 5) + 3(30 \times 5^2) + 5^3 = 27,000 + 3(4,500) + 3(750) + 125 = 27,000 + 13,500 + 2,250 + 125 = 42,875$.

The process of finding the root of a number, the reverse of involution, is known as *evolution* (which see).

J.W.V.

IO, *i' o*, in Greek mythology, the daughter of the king of Argos. She was beloved by Zeus, who, to protect her from the jealousy of Hera (Juno of the Romans), changed her into a white heifer. Hera contrived, however, to obtain the animal from Zeus, and gave her to the care of the hundred-eyed Argus, from whom she was rescued by Hermes. Hera then sent the gadfly to torment the unfortunate Io, and the latter wandered all over the world in her attempts to escape from her tormentor. In Egypt she found rest and freedom from persecution. On the banks of the Nile she assumed her original form. Her son Epaphus, later king of Egypt, was the reputed founder of the famous city of Memphis. See IONIAN SEA.

IODINE, *i' o din*. This important element was discovered in 1812 by a French scientist, B. Courtois, when he was investigating the products from burnt seaweed. Three years later, another Frenchman, J. L. Gay-Lussac (which see), proved that the substance was one of the chemical elements. Iodine is a heavy, bluish-black solid, used to some extent in the arts, but especially valued for its medicinal properties. It belongs to a family of elements called *halogens*, or *salt-producers*, the others being fluorine, bromine, and chlorine. Iodine is widely distributed in small amounts in various minerals, chiefly in composition with sodium and potassium; and in sea water, in seaweeds, and in mineral and medicinal

springs. Formerly it was chiefly obtained from the ashes of kelp, a seaweed, but the principal commercial source at present is sodium nitrate (Chile saltpeter), large deposits of which are found in South America. Iodine usually occurs in flat crystals. When heated, it vaporizes without first becoming a liquid, giving off a heavy dark-violet vapor with an irritating odor somewhat like that of chlorine. Iodine is slightly soluble in water, but readily so in alcohol and ether. In the presence of water it acts as an oxidizing agent (see OXIDATION).

Chemically, iodine is very active and combines energetically with the metals. Antimony powder thrown into iodine vapor burns spontaneously. Mercury and iodine warmed together combine with evolution of much heat. Phosphorus brought in contact with it melts and takes fire. With starch it forms a blue coloration. This affords a most delicate test for either starch or iodine; it is said to enable one to detect one part of iodine in 10,000,000 parts of water. The chemical symbol of iodine is *I* (see CHEMISTRY).

Tincture of iodine, a solution of iodine in alcohol, is a most useful drug for the home medicine chest. It is an excellent antiseptic for cuts, scratches, or abrasions (see FIRST AID TO THE INJURED), and mixed with glycerine it is an effective remedy for canker sore and sore throat, if applied by swabbing. Tincture of iodine is also used to cure ringworm. The yellowish-brown stain formed by iodine can be removed with aromatic spirits of ammonia, but some pharmacies dispense a colorless form of the drug. Potassium iodide, another important compound, is an antidote for lead or mercury poisoning.

Iodine is one of the essential elements required for support of normal life processes. Next to sulphur, it ranks as one of the most important inorganic elements functioning in biochemical changes.

The value of iodine as a preventive and cure of enlargement of the thyroid gland is now widely recognized (see GOITER). When deprived of a certain amount of iodine, the gland becomes thickened, and a goitrous condition results. Preventive and curative measures include the iodizing of the water supply, the introduction of a small quantity of sodium iodide to table salt, and the administration of iodine compounds in chocolate tablets. Some goiter enlargements are cured by being painted with iodine. Anyone living in a region far from the sea should make it a point to eat some sea food at regular intervals. The use of iodine compounds as internal medicines should be under the direction of a physician. Iodine also finds use in photography, the manufacture of certain dyes, and in analytical chemistry.

T.B.J.

iodoform, *i o' doh form*, a yellow crystalline substance used chiefly as an antiseptic for wounds and sores. It is a compound of hydrogen, carbon, and iodine, the last occurring in the proportion of ninety-six per cent. In contact with body fluids, iodoform releases small amounts of iodine, to which it owes its antiseptic properties. Iodoform gauze is employed by surgeons for packing in cases of severe hemorrhage. This chemical possesses the power of exciting a flow of lymph from wounds, thus strengthening the natural defenses of the body, but its disagreeable, penetrating odor has greatly curtailed its use.

IOLA, KAN. See KANSAS (back of map).

IOLCUS. See THESSALY.

ION, *i' on*, an atom or group of atoms carrying either a positive or a negative electric charge. The name, from the Greek for *going*, refers to the movements of the separated electrified particles that travel to the electrodes in a solution undergoing electrolysis. The positive ions go to the negative electrode, or cathode, and are called *cations* (*kal' i onz*); the negative ions, which go to the positive electrode, or anode, are called *anions* (*an' ionz*). Hydrogen and metallic ions are positively charged, and hydroxyl (OH) and non-metallic ions are negatively charged.

According to the *dissociation* theory, now generally accepted, some or all of the molecules of a salt, base, or acid split up, or dissociate, into two parts when the compound is dissolved in water; one of the parts is charged positively and the other is charged negatively. The more water used, the greater the number of ions resulting from dissociation. These ions wander about in the solution until two oppositely charged electrodes are inserted in the electrolyte (the solution) and current is sent through the bath. The positive plate attracts the negative ions, and the negative plate the positive ions. The current is the force that guides the particles to the electrodes. Putting it another way, we say that the ions serve to conduct the electric current in an electrolyte. In a metal conductor, current is conducted by negative units of electricity, or electrons, which are constituents of atoms. H.S.E.

Related Subjects. For a more detailed description of the movements of ions in the electrolytic bath, see ELECTROLYSIS; for the newer theories of the nature of electricity, see ELECTRICITY; CHEMISTRY. See, also, ELECTRIC BATTERY (How a Primary Battery Works).

IONIA, *i o' nih ah*, the ancient name of a region inhabited by Ionian Greeks, comprising the district along the western coast of Asia Minor from the River Hermus to Mount Latmus, and the neighboring islands of the Aegean Sea. Ionia was the cradle of the earliest development in Greek poetry, philosophy, and art. In the familiar legends, the Ionians of Asia Minor were colonists from Attica who

left their homes in Greece about the middle of the eleventh century B.C. At some unknown date, they founded a confederacy of twelve towns, which, though mutually independent, were united for the common good. Famous among these towns were Ephesus, in which stood the celebrated Temple of Diana, one of the seven wonders of the ancient world; and Miletus, distinguished as the birthplace of many philosophers and historians (see *EPHE-SUS*; *MILETUS*).

Ionian first came under the sway of the kings of Lydia in the sixth century B.C.; later, it became a part of the Persian dominions. After the defeat of Persia by the Greeks, it remained a dependency of Athens until the close of the Peloponnesian War, 404 B.C., when the country again fell under Persian rule. Later, the cities were conquered by Alexander the Great, and in 64 B.C. Ionian became a part of the Roman province of Asia. Time and the devastating hand of the Turks have destroyed nearly all traces of the ancient civilization. See *IONIANS*.

IONIAN, *i o' nih an*, *ISLANDS*, a group of islands belonging to Greece, most of which lie in the Ionian Sea, an arm of the Mediterranean. They consist of six large islands and a number of islets. The most famous are Corfu, Ithaca (see below), and Cephalonia. They have a combined area of 1,117 square miles and a population of about 224,000. Geographically, the islands show many differences, but their surface is for the most part mountainous.

On the division of the Roman world in 395, the Ionian Islands became a part of the Eastern, or Byzantine, Empire, and during the Middle Ages they came into the possession of the republic of Venice. After the Napoleonic wars, they were reorganized and made a republic under the protection of Great Britain, a form of government which lasted until 1864, when they were annexed to Greece by consent of the European powers.

Ithaca, one of the smallest of the Ionians, only thirty-seven square miles in area. In legend Ithaca is celebrated as the principality and birthplace of Ulysses, the chief character of Homer's *Odyssey*. In 1860 a German archaeologist made excavations here, and identified several sites mentioned by Homer.

Related Subjects. The reader is referred in these volumes to the following articles:

Homer	<i>Odyssey</i>
Ionian Sea	Ulysses

IONIANS, *i o' nih anz*, one of the four great families or tribes of the ancient Greeks, distinguished from the Achaeans, Aeolians, and Dorians, not only by their artistic and literary superiority, but by a greater love for peace and for luxury. They inhabited Attica, the Cyclades, and the coast of Asia Minor, but whether the Greek mainland, the island region, or the Asiatic shore was their original home, scholars

cannot determine. Of all the Ionians, the Athenians reached the highest plane of civilization, but they were not of the purest stock.

Related Subjects. The reader is referred in these volumes to the following articles:

Achaeans	Dorians
Aeolians	Greece

IONIAN SEA, a portion of the Mediterranean Sea named after the river nymph Io, who, according to the ancient legend, swam across this sea to escape the persecutions of a gadfly which Hera had sent to torment her. Lying south of the Adriatic Sea, with which it is connected by the Strait of Otranto, the Ionian separates Italy and Sicily from Albania and Greece. This sea forms a number of deep inlets on the coast of Greece, the chief of which is the Gulf of Corinth. The Ionian Islands (which see) are located along its eastern margin, off the coast of Greece. See *Io*.

IONIC COLUMN, *i on' ik col' um*. See *COLUMN* (The Greek Orders of Architecture).

IONIC SCHOOL OF PHILOSOPHY. See *PHILOSOPHY* (Greek Philosophy).

ION OF CHIOS (about 500-422 B.C.), a Greek author, a friend of Cimon, Pericles, Aeschylus and Sophocles. Ion made Athens his home in his early manhood, and all of his literary work was done in that city. He was both a prose writer and a poet, although but one work in prose, *Sojournings*, is known. His poetry included a wide range of subjects, from lyrics to tragedies.

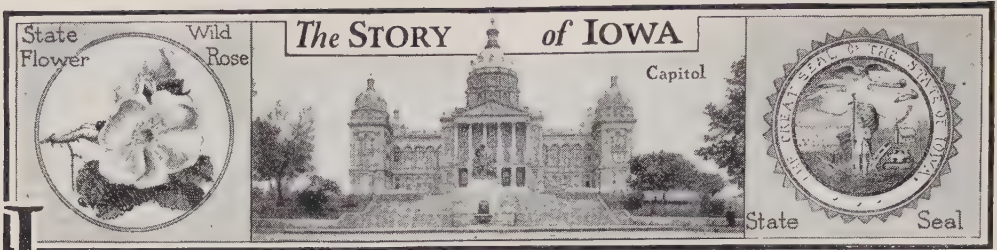
IOPHON, *i o fahn* (about 450-390 B.C.), son of the great Sophocles and a Greek tragedian. However, he is remembered most particularly not for his literary talent but because he endeavored to establish the insanity of his father that control of the family property might fall to him. Sophocles refuted the charge of insanity in a brilliant manner, it is said. There are modern scholars who doubt some parts of the story of the conspiracy of Iophon, but it has been generally accepted for centuries.

IOS, one of the islands of the Cyclades, a Greek archipelago; it is also the name of its only town. It is a local tradition that Homer was buried there.

I. O. U., an abbreviated or phonetic method of writing *I owe you*. It thus forms an acknowledgment or memorandum of a debt, and for formal purposes is usually worded thus:

Chicago, July 14, 1942.
To John Brown. I. O. U. Fifty Dollars.
THOMAS BROWN.

Such a memorandum, since it includes no promise to pay, is not really a promissory note. In certain states, however, it may be endorsed and transferred, like a promissory note. An *I. O. U.* is strong, but not conclusive, evidence in a suit. F.H.E.



IOWA. This North-Central state of the American Union was named for the Iowa River. The name of this river is the same as that of the Indians who in early years inhabited this territory, and was probably derived from the name of the tribe.

When the first pioneers reached Iowa, they gazed in wonder at great prairies, extending farther than eyes could see. The men saw the rich soil beneath the tough prairie grass, which, turned and plowed and planted, would yield endless harvests for them and countless thousands like them. To the pioneer woman, Iowa owes a supreme debt, for she faced life on its vast prairies undaunted. If her heart longed for the trees and white houses of the East, she said nothing, but daily carried water for the seedlings planted to become windbreaks some far-off day. If she dreaded the high grass, carrying danger of fire; the wilderness in which her children, straying, might be lost, she only redoubled her vigilance. If the rain and mud, the blazing sun, or the icy blizzards discouraged her, she but worked the swifter that in time good roads, comfortable homes, schools, and churches might be a dream realized. Certain flowers are universal in our gardens, East or West—lilacs, peonies, old-fashioned roses, hollyhocks; but seldom is credit given those pioneer women who carried the precious slips and roots westward across the land.

The faith of the pioneers has been justified, for Iowa's grain fields are still furnishing their bountiful harvests. The farmer of to-day has learned to feed his crops to his livestock and obtain a greater return, and factories have arisen to utilize the many products of the farms. The windbreaks and woodlots have grown mighty, just as the state and its people have grown strong and sturdy, from pioneer beginnings. Schools and churches bear witness to the character of the people who have made the state one of the most prosperous in the union.

Size and Location. In size, Iowa ranks among the states as the twenty-fourth, having an area of 56,147 square miles. The state nearest it in size is Wisconsin, which is less than 100 square miles smaller. Iowa is, in general shape, a rectangle, bounded on the north by Minnesota, on the west by South Dakota and Nebraska, the latter separated

from it by the Missouri River, on the south by Missouri, and on the east by Wisconsin and Illinois, from which it is separated by the Mississippi River.

Popularly, Iowa is known as the **HAWKEYE STATE**. The origin of this sobriquet is not definitely known. It was first used in an Iowa paper in 1838, and may have been suggested by the name of the Indian chief, Black Hawk. As its flower the state has chosen the wild rose, the choice being made by the legislature and not, as in many states, by the school children; and anyone who has traveled through Iowa in the late spring or early summer will admit the wisdom of the choice.

Its People. In population, Iowa, with 2,419,927 inhabitants in 1925 (state census), ranks sixteenth among the states. It has an average density of 43.5 to the square mile, and is more evenly settled than any other state.

Immigrants have found Iowa a land of promise. In 1925, eight per cent of the population was foreign-born, while over twenty-six per cent was native-born, but of foreign or mixed parentage. In the last two decades, new settlers have come into the state in decreasing numbers because of the opening up of the great Canadian farm lands. These are obtainable at a much lower price than Iowa farms, which are the highest in price of all in America. The great majority of foreigners in Iowa are Germans, Swedes, Danes, Norwegians, and English—people from the northern countries who appreciate the wonderful farm lands and opportunities. Nearly 400 Sac and Fox Indians live on a reservation in Tama County.

According to the state census of 1925, 57.93 per cent of the population live in incorporated cities and towns, while 42.07 per cent live outside. Iowa farmers, however, have been extremely progressive, and were among the first to avail themselves of those advantages—good roads, automobiles, telephones, agricultural clubs—which have done away with isolation and monotony. There are no great metropolitan cities, and only twelve with a population of 20,000 or over. Of these the largest is Des Moines, the capital. Others are Sioux City, Davenport, Cedar Rapids, Dubuque, Council Bluffs, Waterloo, Clinton, Bur-

IOWA

Ackley, (G3).....1,529	Brazil, (H7)..... 550	Coulter, (G3)..... 277	Evans, (K5)..... 590	Harpers Ferry, (L2)..... 328
Adair, (D6)..... 952	Breda, (D4)..... 419	Council Bluffs, (B6)..... 36,162	Everly, (C2)..... 480	Harris, (C2)..... 359
Adel, (E5).....1,455	Bridgewater, (D6)..... 343	Crawfordsville, (K6) 337	Exira, (D5)..... 840	Hartford, (C6)..... 218
Afton, (E6)..... 926	Brighton, (K6).....1,014	Crescent, (B6)..... 380	Exline, (H7)..... 755	Hartley, (C2).....1,306
Agency, (J7)..... 429	Bristow, (H3)..... 299	Cresco, (J2)..... 3,195	Fairbank, (J5)..... 657	Harvey, (H6)..... 422
Ainsworth, (K6)..... 391	Britt, (F2).....1,619	Creston, (E6)..... 8,034	Fairfax, (K5)..... 260	Hastings, (C6)..... 424
Akron, (A3).....1,324	Bronson, (A4)..... 250	Crocket, (H6)..... 210	Fairfield, (K7).....5,948	Havelock, (D3)..... 331
Albert City, (D3)..... 567	Brooklyn, (J5).....1,533	Cumberland, (D6)..... 561	Fairport, (M6)..... 210	Hawarden, (A3).....2,491
Albia, (H6).....5,067	Buffalo, (M6)..... 487	Curlew, (D3)..... 204	Fairview, (L4)..... 250	Hawkeye, (K3)..... 582
Albion, (H4)..... 392	Buffalo Center, (F2) 894	Cushing, (B3)..... 286	Farley, (L4)..... 651	Hazleton, (K3)..... 517
Alden, (G3)..... 840	Burlington, (L7).....24,057	Dakotah, (E3)..... 439	Farmersburg, (L3)..... 290	Hedrick, (J6)..... 901
Alexander, (G3)..... 315	Burroak, (L2)..... 650	Dallas, (G6)..... 643	Farmington, (K7).....1,086	Henderson, (B6)..... 232
Algona, (E2).....3,724	Burt, (E2)..... 626	Dallas Center, (F5) 864	Farragut, (C7)..... 494	Highlandville, (K2)..... 310
Allerton, (G7)..... 954	Bussey, (H6)..... 585	Danbury, (B3)..... 677	Fayette, (K3).....1,085	Hills, (K5)..... 230
Allison, (H3)..... 520	Buxton, (H6).....4,300	Danville, (L7)..... 289	Fenton, (E2)..... 391	Hillsboro, (K7)..... 318
Alta, (C3).....1,290	Calamus, (M5)..... 399	Davenport, (M5).....56,727	Fertile, (G2)..... 223	Hinton, (A3)..... 263
Altavista, (J2)..... 355	Callender, (E4)..... 376	Davis City, (F7)..... 476	Flagler, (G6)..... 400	Hiteman, (H6).....1,050
Alton, (A3).....1,007	Calmar, (K2).....1,039	Dawson, (E5)..... 300	Floris, (J7)..... 252	Hocking, (H7).....1,000
Altونا, (G5)..... 502	Calumet, (B3)..... 266	Dayton, (E4)..... 836	Floyd, (H2)..... 308	Holstein, (B3).....1,248
Alvord, (A2)..... 359	Camanche, (N5)..... 610	Decatur, (F7)..... 300	Fonda, (D3).....1,136	Homestead, (K5)..... 300
Amana, (K5)..... 450	Cambridge, (G5)..... 739	Decorah, (K2).....4,039	Fontanelle, (D6)..... 869	Hopkinton, (L4)..... 759
Ames, (F4).....6,270	Cantril, (J7)..... 440	Dedham, (A4)..... 360	Forest City, (F2).....2,145	Hornick, (A4)..... 296
Anamosa, (L4).....2,881	Carbon, (D6)..... 254	Deep River, (J5)..... 487	Fort Atkinson, (J2) 315	Hospers, (B2)..... 570
Andrew, (M4)..... 289	Carlisle, (F6)..... 640	Defiance, (C5)..... 390	Fort Des Moines, (C5).....1,020	Hubbard, (G4)..... 681
Angus, (E5)..... 248	Carroll, (D4).....4,254	Delhi, (L4)..... 389	Fort Dodge, (E3).....19,347	Hudson, (J4)..... 408
Anita, (D6).....1,236	Carson, (C6)..... 692	Delmar, (M5)..... 527	Fort Madison, (L7).....12,066	Hull, (A2)..... 791
Ankeny, (F5)..... 648	Cartersville, (G3)..... 250	Deloit, (C4)..... 260	Fraker, (H6)..... 150	Humboldt, (E3).....2,232
Anthon, (B4)..... 783	Cascade, (L4).....1,249	Delta, (J6)..... 688	Fraser, (F4)..... 391	Humeston, (G7).....1,214
Aplington, (H3)..... 598	Casey, (D5)..... 908	Denison, (C4).....3,581	Fredericksburg, (J3)..... 624	Huxley, (F5)..... 366
Arcadia, (C4)..... 375	Castalia, (K2)..... 272	Denmark, (L7)..... 300	Fredericksburg, (J3)..... 624	Iadgrove, (B4).....2,020
Arion, (C5)..... 242	Castana, (B4)..... 389	Denver, (J3)..... 462	Fredericksburg, (J3)..... 624	Imogene, (C7)..... 268
Arlington, (K3)..... 729	Cedar Falls, (J3).....6,316	Derby, (G7)..... 334	Fredonia, (L6)..... 250	Independence, (K4).....3,672
Armstrong, (E2)..... 818	Cedar Heights, (J3)..... 341	DES MOINES, (F5).....126,468	Fremont, (J6)..... 544	Indianola, (F6).....3,628
Arnolds Park, (C2)..... 478	Cedar Rapids, (K5).....45,566	De Soto, (E5)..... 261	Fruitland, (J6)..... 250	Inwood, (A2)..... 746
Arthur, (C4)..... 290	Center Junction, (L4)..... 225	De Witt, (M5).....1,849	Galva, (C3)..... 539	Ionia, (J2)..... 280
Ashton, (B2)..... 610	Centerpoint, (K4)..... 773	Dexter, (E5)..... 790	Garden Grove, (F7) 666	Iowa City, (K5).....11,267
Atlantic, (C6).....5,329	Centerville, (H7).....8,486	Diagonal, (E7)..... 569	Garnaville, (L3)..... 314	Ireton, (A3)..... 730
Auburn, (D4)..... 406	Central City, (K4)..... 688	Dickens, (C2)..... 337	Garner, (F2).....1,311	Irwin, (C5)..... 537
Audubon, (D5).....2,108	Centralia, (M4)..... 267	Dike, (H4)..... 453	Garrison, (J4)..... 437	Jamaica, (E5)..... 295
Aurelia, (C3)..... 708	Chapin, (G3)..... 250	Donnellson, (K7)..... 456	Garwin, (H4)..... 587	Janesville, (J3)..... 261
Aurora, (K3)..... 284	Chariton, (G6).....5,175	Doon, (A2)..... 576	Geneva, (G3)..... 244	Jefferson, (E4).....3,416
Avery, (H6)..... 475	Charles City, (H2) 7,350	Douds, (J3)..... 475	George, (B2)..... 788	Jerome, (G7)..... 300
Avoca, (C6).....1,482	Charlotte, (N5)..... 464	Douglass, (K2)..... 300	Gilbert, (F4)..... 221	Jesup, (F4)..... 774
Ayrshire, (D2)..... 361	Charter Oak, (B4)..... 750	Dow City, (B4)..... 572	Gilbertville, (J4)..... 212	Jewell, (F4).....1,090
Badger, (E3)..... 244	Chelsea, (J5)..... 557	Dows, (F3).....1,145	Gilman, (H5)..... 490	Joice, (G2)..... 233
Bagley, (E5)..... 505	Cherokee, (B3).....5,824	Drakesville, (J7)..... 261	Gilmore City, (D3) 919	Jolley, (D4)..... 300
Bailey, (H2)..... 209	Chester, (J2)..... 237	Dubuque, (M4).....39,141	Gladbrook, (H4)..... 961	Kalo, (E4)..... 275
Baldwin, (M4)..... 232	Churdan, (D4)..... 763	Dumont, (H3)..... 609	Glenwood, (B6).....3,862	Kalona, (K6)..... 632
Bancroft, (E2)..... 902	Cincinnati, (H7).....1,301	Duncombe, (F3)..... 442	Glidden, (D4)..... 867	Kamrar, (F4)..... 256
Barnes City, (H6)..... 473	Clare, (E3)..... 259	Dunkerton, (J3)..... 295	Goldfield, (F3)..... 749	Kanawha, (F3)..... 659
Batavia, (J7)..... 560	Clarence, (L5)..... 693	Dunlap, (B5).....1,455	Goodell, (F3)..... 245	Kellerton, (E7)..... 693
Battle Creek, (B4)..... 785	Clarinda, (C7).....4,511	Dunreath, (G6)..... 250	Gowrie, (E4)..... 895	Kellogg, (H5)..... 603
Baxter, (G5)..... 571	Clarion, (F3).....2,826	Durant, (M5)..... 775	Graettinger, (D2)..... 779	Kensett, (G2)..... 338
Bayard, (D5)..... 727	Clarksburg, (H3).....1,003	Dyersville, (L4).....1,933	Graf, (M4)..... 281	Kenwood Park, (K4)..... 702
Beacon, (H6)..... 381	Clayton, (L3)..... 170	Dysart, (J4)..... 955	Grafton, (G2)..... 233	Keokuk, (L8).....14,423
Beaman, (H4)..... 214	Clearfield, (D7)..... 665	Eagle Grove, (F3).....4,433	Grand Jc., (E4).....1,010	Keosauqua, (K7)..... 851
Bedford, (D7).....2,073	Clear Lake, (G2).....2,804	Earlham, (E6)..... 803	Grand Mound, (M5)..... 463	Keota, (K6).....1,025
Beech, (G6)..... 300	Cleghorn, (B3)..... 232	Earling, (C5)..... 321	Grand River, (F7)..... 425	Keystone, (J6)..... 354
Belle Plaine, (J5).....3,887	Clemons, (G4)..... 216	Earlville, (L4)..... 619	Grandview, (L6)..... 341	Keystone, (J5)..... 558
Bellevue, (N4).....1,663	Clermont, (K2)..... 681	Early, (C4)..... 568	Granger, (F5)..... 324	Kimbaltton, (C5)..... 382
Belmond, (F3).....1,797	Clinton, (N5).....24,151	East Peru, (F6)..... 253	Grant, (C6)..... 282	Kingsley, (B3).....1,072
Bennett, (M5)..... 362	Clio, (G7)..... 299	East Pleasant Plain, (K6)..... 240	Granville, (B3)..... 358	Kirkman, (C5)..... 204
Benton, (E7)..... 246	Clover Hill, (F5)..... 469	Eddyville, (H6)..... 961	Gravity, (D7)..... 464	Kirkville, (J6)..... 210
Bettendorf, (M5).....2,178	Clutier, (J4)..... 299	Edgewood, (L3)..... 617	Greeley, (L3)..... 410	Kiron, (C4)..... 294
Birmingham, (J7)..... 539	Coggon, (K4)..... 553	Elberon, (J4)..... 349	Greene, (H3).....1,375	Klemme, (F2)..... 468
Blairsburg, (F3)..... 272	Coin, (C7)..... 603	Eldon, (J7).....2,091	Greenfield, (E6).....1,707	Knowlton, (E7)..... 202
Blairtown, (J7)..... 540	Colesburg, (L3)..... 337	Eldora, (G4).....3,189	Grimes, (F5)..... 524	Knoxville, (G6).....3,523
Blakesburg, (H5)..... 380	Colfax, (G5).....2,504	Eldridge, (M5)..... 234	Grinnell, (H5).....5,362	Lacoma, (G6)..... 502
Blanchard, (C7)..... 429	College Sprs., (C7) 495	Elgin, (K3)..... 623	Griswold, (C6).....1,264	Ladara, (J5)..... 340
Blencoe, (A5)..... 317	Collins, (G5)..... 570	Elkader, (L3).....1,223	Grundy Center, (H4)1,749	Lake City, (D4).....2,110
Blockton, (D7)..... 524	Colo, (G4)..... 507	Elk Horn, (C5)..... 589	Guthrie Center, (D5).....1,727	Lake Mills, (F2).....1,529
Blomfield, (J7).....2,064	Columbus City, (L6) 346	Elliot, (C6)..... 586	Guttenberg, (L3).....1,666	Lake Park, (C2)..... 789
Blue Grass, (M5)..... 205	Columbus Jc., (L6) 988	Ellston, (E7)..... 212	Hamburg, (B7).....2,017	Lakeview, (C4)..... 838
Bode, (E3)..... 513	Conesville, (L6)..... 307	Ellsworth, (F4)..... 512	Hamilton, (H6)..... 474	Lakota, (H6)..... 225
Bonaparte, (K7)..... 656	Conrad, (H4)..... 560	Elma, (J2)..... 874	Hampton, (G3).....2,992	Lakota, (E2)..... 472
Bondurant, (G5)..... 274	Conway, (D7)..... 253	Emerson, (C6)..... 475	Hancock, (C6)..... 276	Lamoni, (F7).....1,787
Boone, (F4).....12,451	Coon Rapids, (D5) 1,328	Emmetsburg, (D2) 2,762	Hanlontown, (G2)..... 202	Lamont, (K3)..... 495
Bouton, (E5)..... 187	Corning, (D7).....1,840	Enterprise, (F5)..... 350	Hanlontown, (G2)..... 202	Lanette, (M4)..... 327
Boxholm, (E4)..... 296	Correctionville, (B4).....1,016	Epworth, (M4)..... 468	Harlan, (C5).....2,831	Lanesboro, (D4)..... 282
Boyden, (A2)..... 419	Corwith, (F3)..... 635	Essex, (C7)..... 727	Harper, (J6)..... 247	Lansing, (L2).....1,447
Bradyville, (D7)..... 294	Corydon, (G7).....1,867	Estherville, (D2).....4,699		Laporte City, (J4).....1,443
Bradgate, (E3)..... 230				
Brandon, (J4)..... 343				
Brayton, (D5)..... 244				



IOWA

SCALE OF MILES

0 5 10 20 30 40
32 MILES TO THE INCH

State Capital (S) County Seats (C)

Railroads, steam (—)

Important Interurban (—)

Electric Lines (—)

All railroads are numbered as per accompanying list, making possible quick and accurate identification of each line.

RAILROADS

- 7 Atchison, Topeka & Santa Fe
- 12 Atlantic Northern
- 42 Chicago & North Western
- 45 Chicago, Burlington & Quincy
- 46 Chicago Great Western
- 51 Chicago, Milwaukee, St. Paul & Pacific
- 54 Chicago, Rock Island & Pacific
- 55 Chicago, St. Paul, Minneapolis & Omaha
- 66 Davenport, Rock Island & Northwestern
- 80 Great Northern
- 87 Illinois Central
- 97 Manchester & Oneida
- 113 Minneapolis & St. Louis
- 122 Missouri Pacific
- 125 Tabor & Northern
- 175 Toledo, Peoria & Western
- 180 Union Pacific System
- 185 Wabash

Hammond's County Map of Iowa
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1000 to 2000 ft

500 to 1000 ft

100 to 500 ft

IOWA Continued

Larchwood, (A2)...	441	Meriden, (B3).....	218	Otho, (E4).....	350	Ruthven, (D2)....	809	Treynor, (B6).....	204
Larrabee, (B3).....	206	Merrill, (A3).....	633	Otley, (H6).....	300	Ryan, (L4).....	397	Tripoli, (J3).....	914
Latimer, (G3).....	359	Meservey, (G3)...	282	Oto, (B4).....	333	Sabula, (N4).....	865	Troy Mills, (K4)...	275
Laurel, (H5).....	195	Miles, (N4).....	333	Ottosen, (E3)...	234	Sac City, (D4)....	2,630	Truro, (F6).....	332
Laurens, (D3).....	914	Milford, (C2)....	908	Ottumwa, (H6)...	23,003	Saint Ansgar, (H2).	844	Udell, (H7).....	214
Lawler, (J2).....	631	Millersburg, (J5)...	210	Oxford, (K5).....	580	Saint Anthony, (G4)	203	Underwood, (B6)...	260
Lawton, (A4).....	243	Millerton, (G7)...	159	Oxford Jc., (M5)...	807	Saint Charles, (F6)	430	Union, (G4).....	660
Le Claire, (N5)...	724	Milo, (G6).....	560	Pacific Jc., (B6)...	666	Salix, (K7).....	494	Unionville, (H7)...	475
Ledyard, (E2)...	246	Milton, (J7).....	845	Packwood, (J6)...	294	Salix, (A4).....	396	University Park, (H6).....	361
Legrand, (H5)...	320	Minburn, (E5)...	418	Palmer, (D3)....	282	Sanborn, (B2)....	1,497	Urbana, (K4).....	477
Lehigh, (E4).....	1,090	Minden, (B6)...	381	Palo, (K4).....	224	Sandspring, (L4)...	200	Urbandale, (F5)...	298
Lemars, (A3).....	4,683	Mineola, (E6)...	250	Panama, (B5)...	220	Schaller, (C3)....	731	Ute, (B4).....	580
Lenox, (D7).....	1,197	Minerva, (G4)...	250	Panora, (E5)...	966	Schleswig, (C4)...	655	Vail, (C4).....	635
Leon, (F7).....	2,193	Mingo, (G5).....	324	Parkersburg, (H3).	1,108	Scranton, (D4)...	843	Valley Jc., (F5)...	3,631
Lester, (A2).....	250	Missouri Valley, (B5).....	3,985	Parnell, (J5)....	325	Searsboro, (H5)...	204	Van Horn, (J4)...	524
Letts, (L6).....	417	Mitchellville, (G5)	752	Paton, (E4).....	414	Sergeant Bluff, (A4).....	548	Vannmeter, (F5)...	358
Lewis, (C6).....	607	Modale, (B5)...	381	Paulina, (B3)...	987	Seymour, (G7)....	1,746	Van Wert, (F7)...	463
Libertyville, (K7).	321	Modell, (B5).....	381	Pella, (H6).....	3,338	Shambaugh, (C7)...	250	Varina, (D3).....	235
Limespring, (J2)...	595	Moingona, (F4)...	250	Perry, (E5).....	5,642	Shannon City, (E7).	333	Ventura, (G2)....	300
Linden, (E5).....	267	Mondamin, (B5)...	508	Persia, (B5)....	380	Sheffield, (G3)...	1,106	Victor, (J5).....	802
Linnville, (G7)...	707	Monona, (L2)....	1,049	Peru, (F6).....	500	Shelby, (C5).....	588	Villisca, (D7)....	2,111
Linn Grove, (C3)...	433	Monroe, (G5)...	936	Peterson, (C3)...	580	Sheldon, (B2)....	3,488	Vinton, (J4)....	3,381
Lisbon, (H5).....	803	Montezuma, (J5)...	1,273	Peterson, (B3)...	554	Shellsburg, (H3)...	815	Viola, (L4).....	230
Liscomb, (L4)....	347	Monticello, (L4)...	2,257	Pilot Mound, (F4).	311	Shenandoah, (C7)...	5,255	Volga, (K3).....	415
Little Rock, (B2)...	573	Montour, (H4)...	409	Pisgah, (B5)....	421	Shenandoah, (C7)...	5,255	Wadena, (K3)....	318
Little Sioux, (B5)...	436	Montpelier, (M6)...	300	Plainfield, (J3)...	500	Sibley, (B7).....	1,803	Walcott, (M5)...	384
Livermore, (E3)...	648	Montrose, (L7)...	549	Plano, (G7).....	272	Sidney, (B2).....	1,154	Walford, (C5)...	130
Lockridge, (K7)...	230	Moorhead, (B5)...	381	Pleasanton, (F7)...	266	Sigourney, (J6)...	2,210	Walker, (K4)....	464
Logan, (B5).....	1,637	Moravia, (H7)...	837	Pleasantville, (G6).	859	Silver City, (B6)...	430	Wall Lake, (C4)...	737
Lohrville, (D4)...	727	Morning Sun, (L6)	751	Plover, (D3)....	246	Sioux Center, (A2)...	1,389	Walnut, (C6).....	1,072
Lone Tree, (L6)...	673	Morrison, (H4)...	207	Plymouth, (G2)...	366	Sioux City, (A3)...	72,227	Wapello, (L6)...	1,480
Lorimer, (E6).....	678	Moscow, (L5)....	280	Pocahontas, (D3).	1,302	Sioux Rapids, (C3).	1,081	Washington, (K6)...	4,697
Lost Nation, (M5)...	537	Moulton, (H7)...	1,387	Polk, (F5).....	277	Slater, (F5).....	616	Washta, (B3)....	508
Lovilia, (H6).....	958	Mount Auburn, (J4)	249	Pomeroy, (D3)...	874	Sloan, (A4).....	608	Waterloo, (J3)...	36,230
Lowden, (M5).....	655	Mountayr, (E7)...	1,738	Popejoy, (G3)...	264	Smithland, (B4)...	321	Watkins, (J5)...	200
Low Moor, (N5)...	277	Mt. Pleasant, (K7)	3,987	Portsmouth, (C5)...	280	Soldier, (B3)....	281	Waukeek, (K4)...	230
Lucas, (G6).....	614	Mount Union, (L6)	225	Postville, (K2)...	1,039	Solon, (L5).....	471	Waucoma, (K2)...	457
Luton, (A4).....	200	Mount Vernon, (L5)	1,466	Prairie City, (G5)...	780	South Amara, (J5)...	300	Waukeek, (F5)...	375
Luverne, (E3).....	610	Moville, (A4)....	878	Preston, (N4)...	648	South English, (J6)	355	Waukon, (L2)...	2,359
Luzerne, (J5).....	180	Murray, (F6)....	847	Primghar, (B2)...	972	Spencer, (C2)....	4,599	Waverly, (F3)...	3,352
Lynnville, (H5)...	461	Muscatine, (L6)...	16,068	Princeton, (N5)...	414	Spillville, (J2)...	315	Wayland, (K6)...	637
Lyons, (N5).....	5,000	Mystic, (H7).....	2,796	Promise City, (G7).	267	Spirit Lake, (D1)...	1,701	Webb, (D3).....	219
Lytton, (D4).....	278	Nashua, (B3)....	1,317	Protivin, (J2)...	201	Springhill, (F6)...	489	Webster City, (F4).	5,657
McCallsburg, (G4)...	261	Neloa, (B6).....	896	Pulaski, (J7)....	419	Springville, (H2)...	597	Weldon, (F7)...	323
McGregor, (L2)...	1,289	Nevada, (G5)....	2,668	Quarry, (H4)....	230	Stanville, (H2)...	513	Wellman, (K6)...	875
McIntire, (H2)....	514	New Albion, (L2)...	683	Quasqueton, (K4)...	453	Stanton, (C7)....	749	Wellsburg, (H4)...	482
Macedonia, (C6)...	352	Newell, (D3).....	809	Quimby, (B3)....	363	Stanwood, (L5)...	556	Wesley, (E2)....	444
Mackdona, (E6)...	228	Newhall, (K5)...	293	Radcliffe, (G4)...	708	State Center, (G4)...	975	West, (K5).....	230
Madrid, (F5).....	1,783	New Hampton, (J2)	2,539	Rake, (F2).....	254	Steamboat Rock, (G4).....	399	West Bend, (E3)...	969
Magnolia, (B5)...	299	New Hartford, (H3)	454	Randolph, (B7)...	404	Sterling, (N4)....	300	West Branch, (L5).	688
Malcom, (H5).....	413	New London, (L7)...	1,144	Rathbun, (H7)...	630	Stockport, (K7)...	385	West Burlington, (L7)	1,212
Mallard, (D3)....	431	New Market, (D5)...	745	Readlyn, (J3)...	403	Stone City, (L4)...	600	West Chester, (K6)...	225
Malvern, (B7)....	1,195	New Providence, (G4).....	255	Reason, (H5)...	226	Storm Lake, (C3)...	3,658	Western College, (K6).....	200
Manchester, (L4)...	3,111	New Sharon, (H6)...	1,084	Redding, (E7)...	289	Story City, (F4)...	1,591	Westfield, (A3)...	203
Manilla, (C5).....	1,142	Newton, (G5)....	6,627	Redfield, (E5)...	770	Stratford, (F4)...	694	Westgate, (K3)...	255
Manly, (G2).....	1,476	New Vienna, (L3)...	241	Redoak, (C6)....	5,578	Strawberry Pt., (K3).....	1,101	West Grove, (H7)...	200
Manning, (C5)....	1,863	New Virginia, (F6)...	424	Reinbeck, (H4)...	1,415	Stuart, (E5).....	1,716	West Liberty, (L5)...	1,834
Manson, (D3)....	1,409	Nichols, (L6)....	387	Rembrandt, (C3)...	270	Sully, (H5).....	393	West Point, (L7)...	591
Mapleton, (B4)...	1,367	Nodaway, (D7)...	340	Remsen, (B3)....	1,144	Summerset, (G6)...	500	Westside, (C4)...	405
Maquoketa, (M4)...	3,626	Nora Springs, (H2)	1,055	Renwick, (E3)...	501	Summer, (J3).....	1,511	Whatecher, (J6)...	1,626
Marathon, (C3)...	520	Northboro, (C7)...	228	Rhodes, (G5)....	439	Superior, (D2)...	200	Wheatland, (M5)...	549
Marble Rock, (H3)...	483	North English, (J5).	933	Richland, (K6)...	639	Sutherland, (C3)...	876	White Sulphur, (M6).....	250
Marcus, (B3).....	1,091	Northwood, (G2)...	1,597	Ridgeway, (J2)...	349	Swaledale, (G3)...	200	Whiting, (A4)....	625
Marengo, (J5)....	2,048	Norwalk, (F6)....	331	Ringsted, (D2)...	559	Swan, (G6).....	238	Whittemore, (E2)...	618
Marion, (K4).....	4,138	Norway, (K5)....	463	Rippey, (E5)....	409	Swea City, (E2)...	691	Whitten, (F4)...	225
Marne, (C6).....	284	Norwoodville, (F5).	220	Riverside, (K6)...	667	Tabor, (B7).....	1,186	Williams, (F3)...	495
Marquette, (L2)...	923	Numa, (H5).....	602	Riverton, (D7)...	568	Tama, (H5).....	2,601	Williamsburg, (K5).	1,251
Marshalltown, (H4).....	15,731	Oakland, (C6)....	1,188	Rockford, (H2)...	1,031	Templeton, (D5)...	373	Wilton Jc., (M5)...	1,178
Martinsburg, (J6)...	278	Oakville, (L6)....	466	Rockingham, (M5)...	1,099	Terril, (D2).....	440	Winfield, (E6)...	1,027
Marysville, (H6)...	234	Ocheyedan, (B2)...	686	Rock Rapids, (A2)...	2,172	Thayer, (E6).....	260	Winterset, (E6)...	2,906
Mason City, (G2)...	20,065	Odebolt, (C4)....	1,445	Rock Valley, (A2)...	1,347	Thompson, (F2)...	548	Winthrop, (K4)...	507
Masonville, (K4)...	250	Ordgen, (E4)....	1,451	Rockwell, (G3)...	800	Thor, (E3).....	285	Woodbine, (B5)...	1,463
Massena, (D6)....	500	Olin, (L5).....	718	Rockwell City, (D4)	2,039	Thornton, (G3)...	317	Woodburn, (F6)...	3,465
Maurice, (A3)....	329	Ollie, (J6).....	385	Roland, (G4)....	829	Thurman, (B7)...	341	Woodward, (F5)...	868
Maxwell, (G5)....	811	Olmitz, (F6)....	248	Rolf, (E3).....	1,031	Tipton, (L5)....	2,142	Woolstock, (F3)...	294
Maynard, (K3)....	387	Onawa, (L4)....	2,256	Rose Hill, (J6)...	260	Titonka, (E2)....	418	Worthington, (L4)	341
Mechanicsville, (L5)	812	Onslow, (L4)....	218	Rowan, (F3)....	302	Toledo, (H4).....	1,604	Wyoming, (L4)...	690
Mediapolis, (L6)...	780	Orange City, (A2)...	1,632	Royal, (C2)....	362	Tracy, (H6).....	200	Yale, (E5).....	276
Melbourne, (G5)...	481	Orient, (E6)....	500	Rubio, (C6)....	220	Traer, (J4).....	1,329	Yorktown, (C7)...	193
Melcher, (G6)....	1,582	Osage, (F2).....	2,678	Rudd, (H2)....	487				
Melrose, (G7)....	450	Osceola, (H6)...	2,884	Runnells, (G5)...	369				
Melvin, (B2).....	282	Oskaloosa, (H6)...	9,427	Russell, (G7)....	633				
Menlo, (E5).....	476	Ossian, (K2).....	858						



ELEVATION ABOVE SEA LEVEL



ANNUAL RAINFALL

lington, Ottumwa, Mason City, and Fort Dodge.

The Roman Catholic, Methodist Episcopal, and Lutheran Churches are the strongest; the strength of the latter is accounted for by the large number of Germans and Scandinavians who have made their homes in the state.

Education. Educationally, Iowa stands in the very front rank among the states, and its percentage of those unable to read and write was lower in 1925 than that of any other state—only .46 per cent, or less than one-half of one per cent. The permanent school fund is very small for so large a state, for the public lands set aside by Congress in the early years for the support of the schools were sold at a ridiculously low figure—from \$1.25 to \$5.00 an acre for some of the richest land in the state. This fund, however, in no way influences the annual expenditure, which has reached a total of over \$65,000,000.

The educational problem of the large rural population is met through state aid in the construction and upkeep of large, centrally located consolidated schools, which are rapidly replacing the small one-room schools. A law enacted in 1919 provides for compulsory part-time schools for children between the ages of fourteen and sixteen who are working on employment certificates. These are established where there are fifteen eligible pupils in the district. In 1911 state aid was granted by law to high schools giving normal-school training for rural teachers. At the head of the school system is the state superintendent of public instruction, and each county has its own superintendent. In 1917 a state board for vocational education was established to take advantage of the aid for vocational education offered by the Smith-Hughes Act.

Under the management of a state board of education are the three state institutions of higher learning:

State University of Iowa. This state institution was established in 1847 at Iowa City, then the

capital of the state, the year after Iowa was admitted to the Union. Upon the removal of the seat of government to Des Moines, the old capitol building and the land on which it stood were given to the university, which was opened in 1855.

The university is coeducational. As contemplated in its organization, it is an integral part of the public-school system of the state. Its work is based upon the preparation afforded by the duly accredited high schools of the state, whose students are admitted to the undergraduate and professional courses upon the presentation of proper certificates, except in the colleges of law, medicine, and dentistry, which require certain collegiate work in preparation. The colleges include liberal arts, law, medicine, dentistry, pharmacy, engineering, education, commerce, and the Graduate College. In addition, there are schools of music, journalism, and nursing. An Extension Division was organized in 1913, the Iowa Child Welfare Research Station in 1917, and the Division of Physical Education in 1924.

Iowa State College of Agriculture and Mechanic Arts, a coeducational institution, established at Ames by the state legislature in 1858. In 1862, in accordance with an act of Congress making provision for agricultural and mechanic education throughout the country, the college came into possession of a valuable grant of public lands (see AGRICULTURAL EDUCATION); seven years later it was opened for instruction.

The college is well equipped for agricultural training. By means of a domain of about 1,905 acres, practical instruction is offered the students, and the close coöperation of the Iowa Experiment Station gives opportunity for original research and experiment in agricultural problems. Short courses throughout the year make it possible for the farmers to secure information in more scientific farming.

The work of the institution includes five lines, namely, agriculture, engineering, home economics, veterinary medicine, and industrial science. It endeavors to serve the state by a correlation of educational, experimental, and extension work.

Iowa State Teachers' College, one of the finest in the United States, was organized in 1876, at Cedar Falls. It trains men and women for the public schools of the state. Iowa has one large normal school, rather than several smaller ones.

The School for the Blind at Vinton and the Iowa School for the Deaf at Council Bluffs are also controlled by the State Board of Education.

Other important schools and colleges in Iowa are: Buena Vista College at Storm Lake; Central College at Pella; Coe College at Cedar Rapids; Columbia College at Dubuque; Cornell College at Mount Vernon; Des Moines University and Drake University at Des Moines; Ellsworth College at Iowa Falls; Graceland College at Lamoni; Grinnell College at Grinnell; Iowa Wesleyan College at Mount Pleasant; John Fletcher College at University Park; Luther College at Decorah; Clark College at Dubuque; Morningside College at Sioux City; Parsons College at Fairfield; Penn College at Oskaloosa; Simpson College at Indianola; Saint Ambrose College at Davenport; University of Dubuque at Dubuque; Upper Iowa University at Fayette; and Western Union College at Le Mars.

Charitable and Penal Institutions. At the head of these there is a Board of Control of State Institutions, which so far as possible is kept non-partisan. It has the power to investigate and to criticize all charitable and penal institutions, whether they be under state or private control. The penal methods of the state are in accord with the most advanced scientific ideas. Special features of the correctional system are the indeterminate sentence, the non-partisan board of parole, and the possible suspension of first sentences in non-serious cases. A statute was passed providing for the sterilization by surgeons of the criminals, idiots, epileptics, and drug addicts in state institutions, but the courts pronounced this unconstitutional. Penal institutions include the State Penitentiary at Fort Madison; the Men's Reformatory at Anamosa; the Women's Reformatory at Rockwell City; an industrial school for boys at Eldora, and one for girls at Mitchellville. The contract system has been abolished in the penitentiaries. In addition to their industrial departments, each penal institution operates a farm. One farm of 781 acres near Des Moines is run by first offenders and good-conduct and short-term prisoners from the Men's Reformatory.

There are four hospitals for the insane, at Cherokee, Clarinda, Independence, and Mount Pleasant. Three of these receive inebriates. The United States government maintains a hospital for war veterans at Knoxville. There is an institution for feeble-minded children at Glenwood, and a hospital for epileptics and school for feeble-minded at Woodward. Charitable institutions for those not defective include the Soldiers' Orphans' Home at Davenport; the Soldiers' Home at Marshalltown; and a juvenile home at Toledo. At Oakdale there is a state sanatorium for the treatment of tuberculosis. At Iowa City the state maintains a large hospital and provides free medical and surgical treatment for those unable to pay for such care. This includes a Children's

Hospital where many crippled children are treated at state expense.

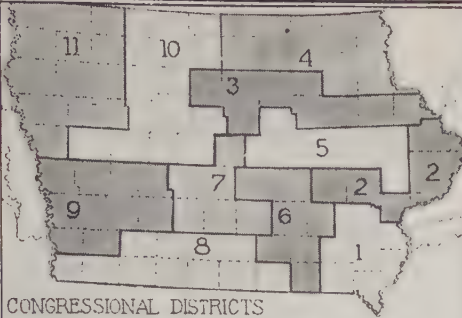
Iowa's Prairies. With even more justice than Illinois, Iowa might be called the "Prairie State," for everywhere is the open, rolling country with its gentle hills and broad, shallow valleys. The average elevation is somewhat over 1,000 feet, with a maximum of only 1,670 feet. Near the northwestern corner of the state is the highest point, and at Keokuk, in the extreme southeast, is the lowest point, with an elevation of only 477 feet.

The prairie country is the result of glaciation. Five great ice sheets swept over Iowa and melted back. Hills were planed off as the ice advanced, while finely ground drift filled the valleys in its retreat. The last ice sheet which entered the state left a deep ridge of drift, or terminal moraine, around its edge. This moraine extends northeast and southeast across the north-central part of the state, and is made up of hills and deep, swampy valleys. Many of the hills reach a height of from twenty to fifty feet. Practically all the lakes in the state are in this area. Streams are few, and where present, they are but shallow creeks. The farmers in this part of the state often must drain their land in order to farm it.

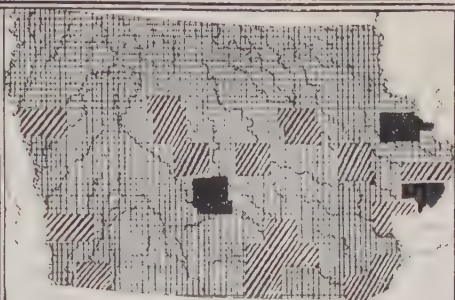
In the northeastern corner of the state is a region of great interest to geologists throughout the world. It is the "driftless area," most of which lies in Wisconsin. No satisfactory explanation has ever been given as to why this region should have been surrounded and yet left untouched by the glaciers. Here one may see how the state would look had the ice never covered it. Instead of the flat prairies, here are deep valleys and gorges carved by erosion, sometimes hundreds of feet deep. Water, nature's workman, has carved picturesque columns, towers, and castles in many of these valleys.

Its Waters. Iowa has a great river on either side, and two-thirds of its area is drained by tributaries of the Mississippi, the rest by those of the Missouri. The southeasterly-flowing streams which empty into the Mississippi are the Des Moines, the largest river of the state, which flows across the central portion; the Iowa, Turkey, Wapsipinicon, Cedar, Maquoketa, Oneota, or Upper Iowa, and Skunk; those which flow toward the Missouri are the Little Sioux, Nishnabotna, Boyer, and Floyd. The hollows carved in the surface of the ground by the glaciers constitute the basins of the beautiful little lakes which dot the northern part of the state. Most famous is Spirit Lake, a favorite summer resort, but Storm Lake, Clear Lake, and East and West Okoboji are much visited also.

The Climate. Far from any body of water large enough to have any effect on its climate, and unprotected by mountains from hot or



CONGRESSIONAL DISTRICTS

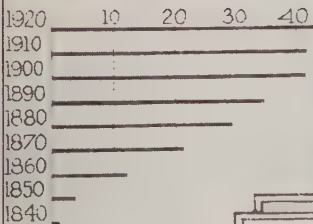


DENSITY OF POPULATION PER SQUARE MILE
 18 to 45 45 to 90 90 and over

Iowa State Teachers' College
 Administration Building.
 Cedar Falls.



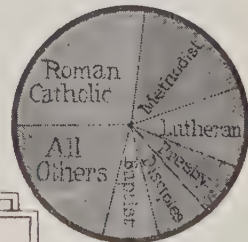
Iowa State College of Agriculture and
 Mechanic Arts, Central Building.
 Ames.



Density of Population
 per square mile



Soldiers and Sailors'
 Monument, Des Moines

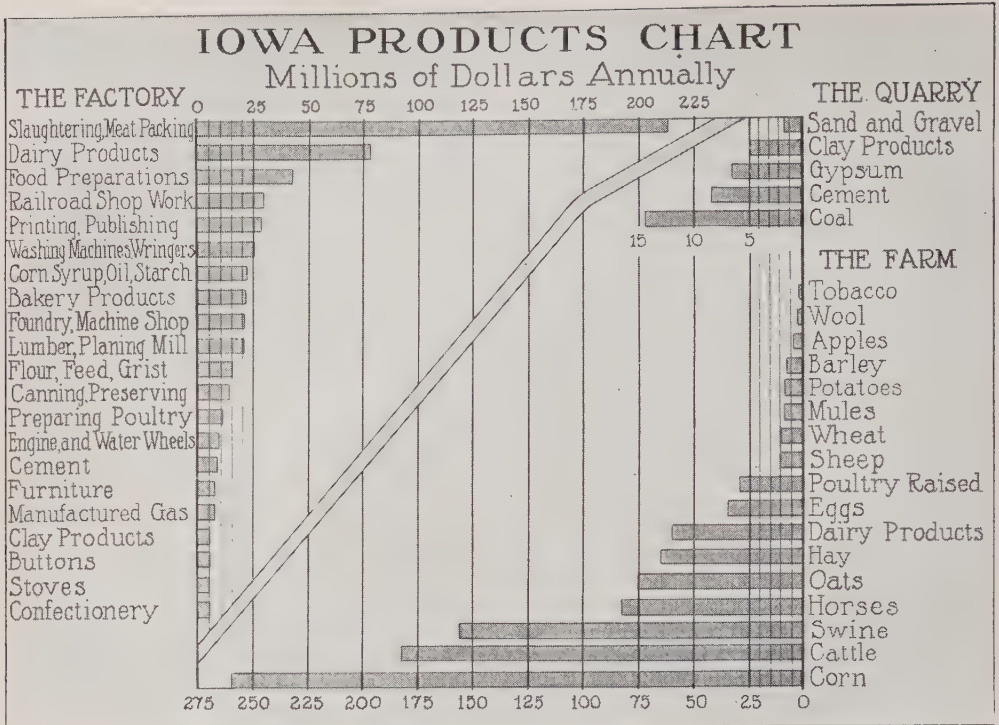


Religion

IOWA



U.S. Census
 VALUE OF FARM LANDS PER ACRE
 \$25 to \$75 \$75 to \$150 \$150 and over



Figures represent averages for three years.

cold winds, Iowa has what is known as a typically continental climate, with great extremes of heat and cold. The average yearly temperature is 48° (Census of Iowa, 1925), but the highest recorded temperature is 113° and the lowest -43° , a total range of 156° . It is only in very exceptional years, however, that such extremes are experienced.

Seldom is the Iowa farmer troubled by drought, for while the average annual rainfall reaches a total of only 32.22 inches (Census of Iowa, 1925), over seventy per cent of it falls during the growing months, from April to October. The northern part of the state frequently has very heavy snows, which drift before the northwest winds.

Forests. The forest area was originally very limited, but much attention has been given to the planting of trees of all kinds, and to-day fine groves are to be seen in many localities. Hardwoods, oak, maple, elm, hickory, walnut, and cottonwood predominate.

Agriculture. Iowa is one of the leading agricultural states in the United States; in the value of all crops, it is second only to Texas, which has five times the land area of Iowa. Iowa has the largest proportion of arable land of any state in the Union. Over ninety-five per cent of its land area is in farms, and of this amount, sixty-seven per cent is improved. The Iowa farmers have had many advantages:

the rich black soil is a source of vast wealth, estimated to be worth as much as all the silver and gold mines in the world; no irrigation has been necessary; no forests have had to be cut down, no stony ground to be worked over, and practically everywhere the land is level enough to make the use of machinery practicable.

About sixteen per cent of the Iowa farms use tractors, and the state ranks second in total number of tractors, only Illinois surpassing it; yet Iowa is first among the states in number of horses, for there are many small farms in the state (the average farm is 160 acres), and on these, horses are as practical as tractors.

One who travels across Iowa in the summer months need not ask what the chief crop is, for endless fields of waving corn stretch away on every side, as far as the eye can reach. Iowa now produces more corn than any other state. Almost one-third of the cultivated area of the state is planted to corn, and the yield is over 400,000,000 bushels yearly. Iowa leads all the states in the production of oats, and to anyone flying across the state, Iowa would seem a vast checkerboard, with its squares alternating fields of shimmering golden oats and tall, green corn. Next in importance are hay and wheat, and there are also large crops of barley and potatoes and other vegetables. Orchard fruits, especially apples and grapes and strawberries, are successfully grown, and the

flower-raising and nursery industries are of importance.

Grass-grown prairies, streams of clear, pure water, and abundance of corn and oats are the conditions needed for successful stock-raising, and in Iowa these are admirably combined. As a result, the state ranks first in the Union in the total value of its livestock, far surpassing all the other states in its number of hogs, and having more cattle than any other state except Texas. It leads in the number of chickens, too, and in its yearly egg output, and stands among the foremost dairy states.

Since the preëminent interests of Iowa are agricultural, it is not surprising to find the state closely coöperating with the farmers, and the farmers with one another for their common advantage. Iowa is the stronghold of the late agricultural movement which resulted in the American Farm Bureau Federation. The Iowa Farm Bureau Federation has a branch in every county, its purpose being to band people together in an attempt to correct the ills of farming through organized effort.

The state department of agriculture, which is self-supporting, gives valuable assistance to the farmer. Its work is done through several divisions, including dairy and food, animal health, weather and crop service, which works in coöperation with the United States Weather Bureau and the state entomology division. Bovine and avian (poultry) tuberculosis are being rapidly eradicated through the work of the animal-health division.

The Agricultural Experiment Station, a farm warehouse law, state, county, and district fairs, numerous associations of grain dealers and stock shippers, and hundreds of cooperative associations, grain elevators, and creameries, all give the farmer the best advantages obtainable.

The Iowa State College, with the coöperation of the United States Department of Agriculture and County Farm Bureaus, conducts home-economics extension work. The training-school method is employed, those who receive the training gathering together their neighbors and passing it on to them. The women study not only clothing and nutrition, but rural social problems, home management and decoration, child care and training, and home health and sanitation.

The Chief Minerals. Coal occupies, among the minerals of Iowa, the same preëminent position that corn does among the crops, about three-fifths of the total output of the mines being bituminous coal. More than one-third of the state is underlain by coal beds, but some exist under conditions not suitable for mining. It is estimated that the workable area includes about 12,750 square miles or 8,160,000 acres, and contains possibly 29,950,000,000 tons of coal. Iowa exports little

of its annual yield, finding ample use for it within the state. Cement ranks second to coal in its value to the state.

Next in importance is gypsum, in which Iowa ranks second in the Union, and fourth comes clay, of which drain tiles and common bricks are made. Minerals yield the state more than \$35,000,000 annually.

Years ago the lead and zinc mines were valuable, but to-day the return from them is too small for the expense of mining in competition with the big lead and zinc states.

Manufactures. For many years the manufactures of Iowa were decidedly limited, because farming seemed the logical industry, but gradually other industries have grown up as a result of raw materials furnished through the farms, mines, and rivers.

Sioux City is the chief industrial center of the state, Cedar Rapids and Des Moines ranking next. Then in turn come Ottumwa, Waterloo, Davenport, Dubuque, Clinton, Mason City, and Muscatine.

Naturally enough, in the foremost livestock state of the country, slaughtering and meat packing ranks first among the industries, the total value of its product being more than twice that of any other industry. Dairy products—factory-made butter, cheese, and condensed milk—rank second. Food preparations; corn products—syrup, oil, and starch; flour, feed, and grain-mill products; canned and preserved goods—are all naturally found in the list of Iowa's first dozen manufactures. Iowa ranks high in the manufacture of washing machines, clothes driers, and ironing machines, a tribute, perhaps, to the state's progressive attitude toward its women. Poultry killing and dressing is a remunerative industry in the foremost poultry state.

Strangely, in a state which contains practically no forests, the lumber industry once attained considerable proportions, logs being brought to the sawmills from Minnesota and Wisconsin. Of late years, this industry has declined, as more mills have been erected in the forested states.

The Mississippi River gives Iowa one of its most characteristic and interesting industries, the manufacture of pearl buttons from mussel shells; the industry centers at Muscatine. A dam and power plant in the Mississippi River at Keokuk furnishes great electric power.

Transportation. The Mississippi River is used to some extent, but for the most part the state depends little upon waterways. With a new barge line on the Mississippi, however, and new dock facilities at Iowa river ports, inland water transportation will doubtless increase. Excellent railway transportation is afforded by the great transcontinental trunk lines. There are over 9,800 miles of track in

the state. The principal lines are the Chicago, Rock Island & Pacific, the Chicago, Milwaukee, Saint Paul & Pacific, the Chicago & North Western (the first railway completed across the state), the Chicago, Burlington & Quincy, the Minneapolis & Saint Louis, the Illinois Central, and the Chicago Great Western. Nearly 600 miles of interurban electric lines and over 6,000 miles of state highways bring the farmer closer to his market. Of these roads, over 1,500 miles had been paved in November, 1928, and over 1,000 miles surfaced with gravel. Iowa has the largest ratio of automobiles per capita in the United States.

Government. The constitution under which the state is at present governed dates from 1857. Every tenth year, counting from 1870, the question of holding a convention to revise and amend it is submitted to the people. Direct primaries are provided for by statute. Except in times of war, the state is forbidden to incur a debt greater than \$250,000, unless such debt is for some single work or purpose and is approved by a vote of the people.

In 1884 a statute was passed prohibiting the manufacture and sale of intoxicating liquors; but this was not well enforced, and was practically succeeded by the so-called "Mulct Law," which made possible the sale of liquor on the petition of a certain proportion of the voters of each county. On January 1, 1916, the state repealed the "Mulct Law" and again adopted state-wide prohibition.

The governor, lieutenant governor, secretary of state, auditor, treasurer, and attorney-general are elected for terms of two years each. A superintendent of public instruction is elected for four years. The governor, secretary of state, auditor, treasurer, and secretary of agriculture compose an executive council which has special powers, such as directing the taking of the census, auditing the accounts of the state departments, providing for the incidental expenses of the state officials, and canvassing election returns.

The legislative department consists of the usual two houses, a senate of fifty members and a house of representatives restricted to 108 members. Representatives are elected for two years and senators for four years, the terms of one-half the senators expiring every two years. Sessions are biennial, and unlimited. The house of representatives alone has power to bring impeachment proceedings, the senate constituting a court before which such a trial is brought.

At the head of the judicial department is a supreme court consisting of a chief justice and seven associate justices, each elected for a term of six years. Below this there are twenty-one district courts, each with from two to six judges elected for four years. Any city having a population of 4,000 or more may

establish a superior court, each with one judge chosen for four years, or any city having a population of 5,000 or more may establish a municipal court.

Since 1924, Iowa has operated under a state and local budget plan, at the head of which is a state budget director appointed by the governor.

History of Iowa. The Iowa Indians, from whom the state took its name, were living in this territory in 1673, when the first white men, Marquette and Joliet, on their voyage down the Mississippi, landed on Iowa soil. In 1680 another Frenchman, Father Hennepin, made a journey along the eastern border of Iowa. Julien Dubuque, a French-Canadian, entering the country in 1788, obtained from the Fox Indians a grant of land at the present site of Dubuque; there he built a trading post, and opened up lead mines. When he died in 1810, the site was abandoned temporarily, because, so the story goes, the Indians refused to allow anyone else to work the lead mines of their friend.

Meanwhile, in 1803, the whole region of Iowa as part of the Louisiana Purchase (which see) came into the possession of the United States. When Louisiana was made a state in 1812, Iowa became a part of Missouri Territory, and after Missouri was created, in 1821, Iowa formed part, in turn, of the territories of Michigan (1834-1836) and of Wisconsin (1836-1838). From 1821 to 1834, it was part of the unorganized territory of the United States.

Gradually the Indians were induced to cede their rights to the land in Iowa. At the close of the Black Hawk War, the Sac and Fox Indians signed a treaty by which they gave up their land in Eastern Iowa to the government. In 1837 they ceded another strip, and in 1842 they agreed to give up the last of their land in Iowa. By treaties with the Winnebago and Potawatomi, in 1846, and with the Sioux, in 1851, all of the land in Iowa was secured from the Indians. In 1838 Iowa was organized as a separate territory. In the meantime, pioneers had pressed into the territory, attracted by the lead mines and by the farm land, and Fort Madison, Burlington, and Dubuque had been founded. By 1840 the territory had a population of more than 43,000, and the question of statehood came prominently to the fore. The measure was defeated in that year and again two years later, but in 1844 it was passed, and a constitutional convention was assembled. Even then progress was slow, for two constitutions were drawn up and rejected, and Congress caused delay because of the boundary question. Iowa in those days included much of the present state of Minnesota, but when it was finally admitted to the Union, on December 28, 1846, it was restricted to its present boundaries.

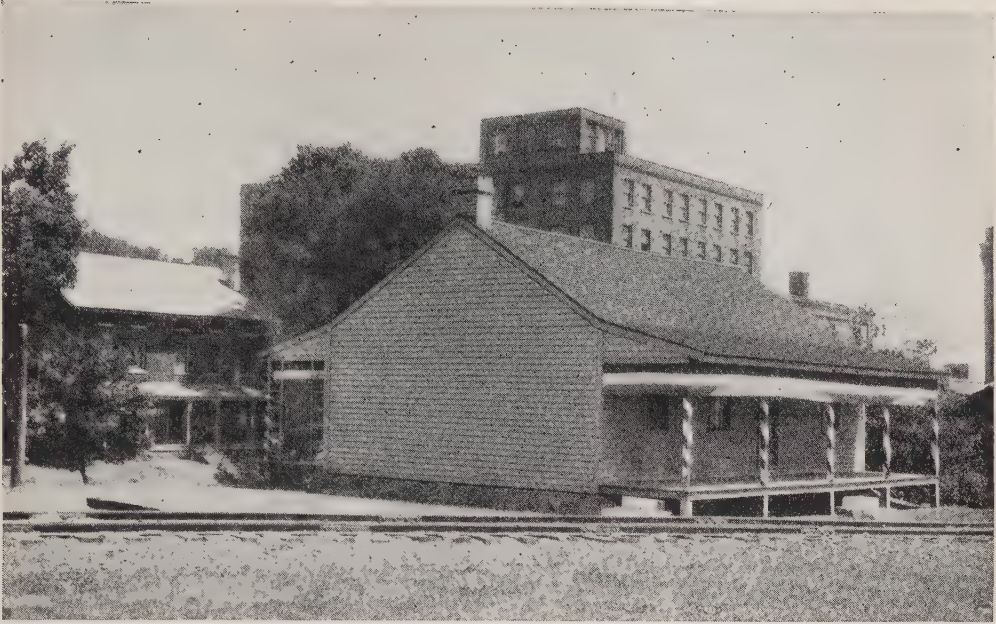


Photo: U & U

LECLAIRE HOUSE, AN HISTORIC SHRINE

It was in this house, with LeClaire as friend and interpreter for the Indians, that early treaties between the United States government and the Sauk and Fox tribes were consummated. On these treaties are based the rights of title to much of the land of Iowa. In 1923, the house was donated to the C.R.I. & P. Ry., by Mrs. Dorothea Vollmer, restored by the railway company, and transferred to Hannah Caldwell Chapter, Daughters of the American Revolution, to be maintained permanently by them as an historic shrine of early Iowa days. The illustration shows the old LeClaire House as it is to-day, near the business district of Davenport.

The year 1857 was a memorable one in the history of the new state. The constitution was revised, the capital was removed from Iowa City to Des Moines, and there took place at Spirit Lake, in the northwestern part of the state, a brutal massacre of the white settlers by the Sioux Indians. It was feared that this disaster might frighten away immigrants, but it had no such effect, and the state progressed rapidly. There had been from the first no question as to the position of Iowa on the slavery question, and it did its full share to aid the Northern cause during the War of Secession.

Although the construction of railroads in Iowa had been started in the middle fifties, progress was delayed during the Civil War. Immediately following the war, there came a period of rapid railway-building. Iowa was strategically located, since Chicago's early prominence as a railroad center meant that the main lines to the West would cross Iowa.

The first bridge across the Mississippi River south of Saint Paul was constructed at Davenport. For years it was considered an engineering triumph, but if it brought glory, it also brought troubles to its backers, the railroads. Saint Louis objected to the bridge on the score that it would interfere with river traffic,

but chiefly because through trains meant more commerce for its great rival, Chicago. The bridge was destroyed by fire when a steamer rammed it, and though the river men cried "Accident," the courts decided otherwise and granted the railroad damages. Litigation over the bridge went on for years, until, finally, permission for a bridge was secured from Iowa, Illinois, and the United States.

With the coming of the railways, farm land in Iowa began to rise in price, and like most speculations, when the bubble broke, many farmers and banks met disaster. In the latter part of the nineteenth century, the anti-railway, or "Granger," movement began in the Middle West states, which felt that railway charges were exorbitant and discriminating. Groups were formed to protest, and in 1878 Iowa established a commission to standardize rates. One lasting result of the Granger movement is now seen in the close coöperation among the Iowa farmers and between the farmers and the state.

From the date of its admission to the Union until 1854, Iowa was Democratic, but from the latter date it has been consistently Republican, only one Democratic governor holding office in all that time. In 1912, the year of the split in the Republican party, the state cast

QUESTIONS ON IOWA

(An outline suitable for Iowa will be found with the article "State.")

For what reason has the problem of education in Iowa been particularly difficult, and how has the difficulty been met?

How does Iowa rank among the states as regards the value of its livestock? How many states have more hogs? More chickens? Why is livestock so important in this state?

Who were the first white men to visit the territory? Who was the first to live within its limits?

How does Iowa rank in literacy?

What could the traveler across Iowa discover as to its chief crops? How does it rank among the states in the production of these crops? What is the chief mineral?

Discuss the means by which state and farmer coöperate for the common good.

What connection is there between the religious denominations of the state and the nationality of the foreign-born citizens?

What special advantages do the Iowa farmers have over those of many other states?

How is the debt-incurring power of the state limited? Mention several forms of progressive legislation that have been enacted.

Name and discuss two distinguished institutions of higher learning.

Is the city or the country population increasing the more rapidly? Why? What advantages has the Iowa farmer of to-day that the farmer of a generation ago did not have?

If the people of Iowa become dissatisfied with their constitution, how long will it be before they have an opportunity to change it?

Mention three events that made the year 1857 stand out in the history of Iowa.

What decided difference is there in the distribution of population in Iowa and that in Illinois?

What effect has the development of Canada had on the population statistics of Iowa?

What was the Glacial Period? What effect did it have on the surface features of this region?

Describe, locate, and try to give a reason for the "driftless area."

How has the position of Iowa been of advantage to it as regards railway transportation?

In what way did the Mississippi River make legal trouble for the early railways?

Of how many territories has Iowa formed, in turn, a part? When was it admitted to the Union?

What state is about 100 square miles smaller than Iowa?

Mention five names that recall the fact that this territory was once inhabited by the Indians.

How are the two greatest manufacturing industries connected with the agricultural production of the state?

How and when did this region come into the possession of the United States?

To what does the popular name of this state refer? How was the state flower chosen, and what is it?

How did the state receive the name of Iowa?

How do the laws in connection with penal institutions prove the progressiveness of the state?

What was the attitude of Iowa during the War of Secession?

What was the nature of the Granger movement, and in what way has it proved of lasting benefit to the state?

What citizen of Iowa was for sixteen years Secretary of Agriculture of the United States, and under what Presidents?

its vote for Wilson; in 1916, 1920, 1924, and 1928, for the Republican ticket.

B.E.M.

Related Subjects. The following articles in these volumes contain much that is of interest in connection with a study of Iowa:

CITIES AND TOWNS

The cities listed below are treated in these volumes under their own titles. Others will be found listed on the back of the colored state map.

Cedar Rapids
Davenport
Des Moines
Sioux City

HISTORY

Amana
Grange
Indians, American
Louisiana Purchase

PRODUCTS AND INDUSTRIES

Apple
Cattle
Corn
Dairying
Egg
Gypsum
Hay
Hog
Meat and Meat Packing
Oats
Poultry
Wheat

RIVERS

Mississippi
Missouri

IOWA CITY,

IA. See IOWA (back of map).

IOWA FARM BUREAU FEDERATION.

See IOWA (Agriculture).

IOWA INDIANS. See INDIANS, AMERICAN (Most Important Tribes).

IOWA RIVER. See IOWA (Its Waters).

IOWA STANDARD OF HANDWRITING.

See EDUCATION (Measurement of Handwriting).

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS. See IOWA (Education).

IOWA STATE TEACHERS' COLLEGE.

See IOWA (Education).

I PAGLIACCI, *e pahl yaht' che*. See OPERA (Some of the Famous Operas).

IPECAC, *ip' e kak*, a drug obtained from the dried roots of a small shrubby plant found in tropical South America. It is a white, odorless, almost tasteless powder, and is a powerful poison. In moderate doses, ipecac causes nausea and vomiting, but its use as an emetic is confined to the treatment of children's ailments. Smaller doses promote the secretions of the respiratory tract, and are useful in relieving spasmodic croup. Ipecac is used

chiefly in connection with opium for the promotion of sweating. In this form, the two drugs are known as *Dover's powder*. Ipecac in large doses is prescribed in cases of amoebic dysentery, and opium or other drug is then

used to check vomiting. *Emetine*, an active principle in ipecac, may be substituted for this purpose if given hypodermically. This alkaloid does not produce nausea. Ipecac is administered in the form of a powder, as a fluid extract, as a syrup, and as a wine. It should be taken only as prescribed by a physician.

IPHIGENIA, *if e je ni' ah*, the heroine of several Greek legends. Agamemnon, king of Argos, incurred the wrath of Artemis (Diana) by killing a hind sacred to her. In revenge she prevented the Greek fleet from sailing



IPHIGENIA SAVED FROM THE SACRIFICE

to Troy, and would only be appeased upon the condition that Agamemnon sacrifice to her his daughter, Iphigenia. When Iphigenia was brought to the altar, she disappeared, and a hind lay there in her stead. Artemis carried her off in a cloud to Tauris, where, acting as the priestess of the goddess of the chase, she sacrificed all strangers in honor of her mistress. In the course of time, Orestes, Iphigenia's brother, came there in search of her, but just as she was about to sacrifice him, a happy recognition took place. Orestes then took her, together with the sacred wooden image of Artemis, to Attica. See MYTHOLOGY; ORESTES.

Literary References. Iphigenia's story has been immortalized in plays by Euripides, Racine, Goethe, and Schiller, and is the subject of two operas by Gluck.

IQUIQUE, *e ke' kay*. See CHILE (The Cities).
IQUITOS, *e ke' tos*, a city in Peru. See AMAZON RIVER.

IRAN, *e rahn'*, the name given to the kingdom of Persia when it embraced the land between the Hindu Kush Mountains, the Tigris River, and the Persian Gulf. The wide extent

of this old country showed a great variation in climate and presented wide diversity in the traits and customs of its people. Ancient Persian stories speak of *Turan*, the regions of Asia inhabited by tribes coming from Tartary, as a land of darkness, while *Iran* was the land of light. See PERSIA.

Iranian Languages. The range of Iranian culture was extensive, and historically covers a period of more than 2,500 years. The two oldest known languages are the old Persian of cuneiform inscriptions (which see), and the old Bactrian, of Zend, from which came the Zend-Avesta, as the sacred book of the Parsees was called. The middle Iranian period extends to about the tenth century of Christian civilization. The modern Iranian languages are written in Arabic script, and the dialects of the Kurds form numerous branches of the Iranian language. See ZEND-AVESTA.

IRAQ (also spelled IRAK), *er akk'*, a new kingdom on the border of Asia Minor, comprising practically all of ancient Mesopotamia.



LOCATION MAP

In the latter country were combined the Turkish vilayets (provinces) of Basra, Baghdad, and Mosul, and these are now the geographical divisions of Iraq. The new country covers 143,250 square miles, only a little less than the area of California, and the population is nearly 3,000,000, almost entirely Mohammedan. Iraq is bounded on the north by Turkey and Syria; on the east by Persia; and on the south and west by the desert land of Arabia.

The great alluvial plain stretches northward from the Persian Gulf to the rolling hills of Mosul, and is watered by the historic rivers Euphrates and Tigris, which flow in nearly parallel courses to the gulf. Although the soil is rich and fertile, the hot, dry summers and rainy winters necessitate irrigation in certain districts for the production of crops. The

chief products are wheat, barley, dates, rice, and cotton. More important, perhaps, than agriculture is the development of the oil fields in the province of Mosul.

The New Kingdom. Mesopotamia was conquered by British forces during the World War, and by the Treaty of Sèvres, Turkey was forced to recognize it as an independent state. In 1920 a Council of State was formed, and in 1921 Emir Faisal was proclaimed king of Iraq by election of the people. The legislative body, called the Constituent Assembly, consists of a Senate of twenty members and a Lower House of eighty-eight deputies.

The League of Nations gave a governing mandate over Iraq to Great Britain in 1920; agitation in Iraq for the replacing of the mandate by a treaty of alliance led to the ratification of a substitute treaty in 1924, which provided for an alliance within the scope of the mandate. This treaty was planned to extend only until 1928, when it was thought that Iraq would be independent, but the settlement of the Mosul question made a new treaty necessary.

Turkey had made several attempts to regain the oil fields in the northern part of Mosul. In 1922 the Turks attempted to undermine King Faisal, and at the Lausanne Conference, in November of that year, they demanded a part of Mosul, but the allied powers rejected the plea. In 1925 the Council of the League of Nations awarded the province of Mosul to Iraq, and provided that the relationship between Great Britain and Iraq should be continued. The treaty signed in 1926, providing for Britain's mandate to be continued for twenty-five years, or until Iraq should become a member of the League of Nations, was replaced in 1928 by still another agreement between the two countries. This latest treaty recognizes the immediate independence of Iraq as a sovereign state, and promises Great Britain's support of Iraq's application for entrance to the League in 1932. Great Britain continues to act in an advisory capacity, however, through its High Commissioner.

The Cities. Iraq contains the centuries-old city of Baghdad and the city of Mosul. There are no other towns of importance.

Mosul, the capital of the province of Mosul, lies on the Tigris River in the midst of the rich oil-field region which, in the past few years, has been the cause of so much controversy between Turkey and Great Britain. Although it is a former Turkish city, the population of Mosul, which is estimated to be about 80,000, is composed of an intermixture of races, with Arabs predominating. Originally, the city was Arabic, and was known for its fine muslins. For many years Mosul decreased in importance, but interest in the oil fields reversed this decline. The railway, which now reaches a point only about seventy miles distant, will probably be a factor in the growth of the city.



THE MARKET-PLACE OF MOSUL

Photo: U & U



Photo: U & U

ROUND BOATS ON THE TIGRIS RIVER

Such vessels have been in use for hundreds of years, but are gradually being superseded by more modern craft.

Baghdad (this spelling superseded BAGDAD in 1923 by decision of the Geographic Board). This romantic old city, famed in literature as the scene of the Arabian Nights tales, is the capital of the former Turkish province of the same name. It lies on both banks of the Tigris River, which separates the old town, on the west, from the newer portion on the east. Contrasted with the squalid houses and narrow, winding streets of old Baghdad are the improvements of the modern section, with its university, the new House of Assembly, telephone and electric-light systems, and sanitary conveniences. Typical of the place are the Turkish houses, without windows on the street side. Yet, behind the walls of many of these uninviting homes are interior courtyards ornamented with gardens and fountains. The numerous mosques, some

partly in ruins, and the bazaars, with their display of Oriental wares, are in keeping with the Turkish aspect of Baghdad. The city carries on a brisk trade in

leather, silks, carpets, and ornamental fabrics. Previous to the opening of the Suez Canal, in 1869, it was one of the chief centers of trade on the caravan route to India. The completion of the Baghdad Railway (see below) will greatly extend its commercial importance.

The city was founded in A.D. 762 by the Caliph Al-mansur, and was long the rich and influential capital of the caliphs. In 1638, after varying fortunes, it was annexed to the Ottoman Empire. During the

World War, it was an objective point of the Allies. In 1915 a British expeditionary force, advancing northward from the Persian Gulf, reached Ctesiphon, only eighteen miles from Baghdad; in 1917 another



Photo: O R O C

TOWERING MINARETS IN BAGHDAD

Symbols of the Moslem's devotion to his god (see MINARET).



Photo: O R O C

MODERN BRIDGE IN AN ANCIENT SETTING

It crosses the Tigris River at Mosul. In the background are the mounds of Nineveh.

British army captured the city and penetrated the country to the north (see WORLD WAR). The city made progress under King Faisal's rule, the outstanding event being the establishment of the university. The king laid its foundation stone in April, 1922, and the first block was opened in 1926. An air station has been established at Baghdad, on the route from Europe to India.

The population, which is estimated to be 170,000, is composed chiefly of Arabs, Turks, Armenians, Persians, Jews, and a few Christians.

Baghdad Railway. Baghdad lies on the natural overland route from Constantinople to India, and a railway on this route was long desired. After Russian and British offers to build such a line were rejected, Turkey, in 1902, officially gave the right to a German company. The Euphrates Valley, or Baghdad, Railway was known as a German enterprise, but it is interesting to note that German capitalists invested only forty per cent of the capital, French capitalists supplied thirty per cent, and the remainder was divided among Austrian, Swiss, Italian, and Turkish financiers. The construction work proceeded slowly, and in disconnected sections, so that in 1914, when Turkey entered the World War, about 500 miles out of a total of 1,314 miles were actually in operation. With the outbreak of war the construction was pushed rapidly, both because the line was of military importance and because it was needed to transport to Germany and Austria-Hungary the mineral and agricultural products of Mesopotamia.

After the Armistice, in 1918, which ended the dream of German ascendancy, the entire project was turned over to the British. In 1924 the line was completed from Baghdad southward to Basra, on the Persian Gulf, and north of Baghdad to Shergat. The line connects with the Syrian system and carries traffic as far as Nisibin, just north of the northwest boundary of Iraq. In 1926 a plan to continue construction of the railway on the more fertile side of the Tigris River was undertaken.

IRAWADI, *ir ah wah' die*, RIVER. See IRRAWADDY RIVER.



IRELAND, the EMERALD ISLE of millions of loyal Irish, who, whether they still live within its borders or have found other homes across the seas, look upon the island as the fairest spot under heaven. Politically, it was long known as the smaller member of the United Kingdom of Great Britain and Ireland; to-day, the greater part of the land is known as the Irish Free State. This section is a member of the British Commonwealth of Nations, while Northern Ireland remains in close relation to Great Britain. Geographically, Ireland is a large island to the west of Great Britain, which at least twice during the geologic ages was a part of Great Britain and of the land mass of Europe.

Though long united politically more or less closely with England, Ireland has preserved a very distinct identity of people, tradition, and emblem. The emerald green and the golden harp with silver strings are more universally known than almost any other national symbols, while the shamrock, its flower, is seldom mentioned or thought of except in connection with Ireland:

There's a dear little plant that grows in our isle—

'Twas Saint Patrick himself sure that set it;

And the sun on his labors with pleasure did smile,

And with dew from his eye often wet it.

It shines through the bog, through the marsh, and the mireland,

And he called it the dear little shamrock of Ireland.

Size and Position. Among the islands of the world, Ireland is sixteenth in size, having an

area of 32,596 square miles. That is, this island with its strongly individual population and its important place in the eyes of historians is a little smaller than the state of Maine. Its greatest dimension is the diagonal, 302 miles long, from Mizen Head in the southwest to Torr Head in the northeast,



COMPARATIVE AREAS

Maine has 33,040 square miles;
Ireland, 32,596 square miles.

and its greatest breadth is 174 miles.

Division of Ireland. The island has had a new status since 1922, when, on January 14, the Dail Eireann (a provisional Irish Parliament) ratified the treaty with Great Britain creating the Irish Free State. There have since been two governments in Ireland—Northern Ireland, consisting of the six counties of Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone, and the Free State, which comprises all the remainder of the island. The division is practically a political separation of the Protestant north and the Roman Catholic south. The following paragraphs give descriptions of the island as a unit.

The People and Cities. There are certain qualities which stand out as characteristic of the Irish. "Witty as an Irishman" is an expression which has a sound basis in the peculiar mental slant which enables them to catch the humorous point of view and to express it in most telling phrase. The homely speech of the peasant class abounds in words and phrases which have an especial aptness and charm, and the writers who have taken as their field the

common everyday life of Ireland have found in this peasant-language a rich mine. The country has a great fund of romantic folklore,



NORTHERN IRELAND AND THE IRISH FREE STATE

The counties constituting Northern Ireland are shown in black; those of the Free State are in light shade.

which is kept alive from generation to generation in every home. Something of Ireland's literary achievement is told in the article **IRISH LITERATURE.**

The Irish are also a most kindly and industrious people, and in the countries to which they have emigrated, many have become useful and leading citizens. They are in general of a more cheerful temperament than the English or Scots, and seem to have something comparable to the traits of the laughter-loving people of France; however, for the poorer classes life has been so hard, for generation after generation, that a certain hopelessness has established itself as a part of the national character.

The mass of the Irish people are descendants of a Celtic race, the relationship of which to the Celts of Great Britain is not understood (see **CELTS**). The early invaders of different races, whether from England, Scandinavia, or the Mediterranean countries, were absorbed into the original stock without changing its character, though the Celtic tongue gradually sank into the background. The English and Scots who came later, however, and settled in the northeastern part of the island, were never assimilated, difference in religion rather than in race—for the newcomers were Protestants—emphasizing the division; and even to the

present day, the friction between the two factions has not disappeared.

The population of Ireland shows a very interesting line of growth and decrease. In 1770 there were about 2,500,000 people in the island, but shortly after that date, the population began to increase rapidly. Economic conditions were better, and a very satisfactory food-stuff, the potato, had been found, which would grow easily and was palatable as well as nutritious; thus the supporting power of the land began to be taxed to the utmost. In 1821, when the first official census was taken, the population was 6,800,000; twenty years later it reached 8,196,000—the high-water mark. A potato famine in 1845 brought death to many, and was the cause of the first extensive emigration of Irish to other lands—an emigration which has continued ever since. Between 1847 and 1852, more than 1,000,000 went to the United States, which has remained the most popular foster-country for the Irish. Every census-taking reveals a decline in population, but in 1926, with its population of 4,229,124, Ireland still had 130 people to the square mile. Of these, 2,972,802 were in the Free State; 1,256,322 were in Northern Ireland. Two-thirds of the people live under rural conditions, but the number of dwellers in cities or towns of 2,000 or more is increasing at the expense of the rural element.

Religion. Though the Irish did not embrace the doctrines of the Reformation as did the English, an established Irish Church was forced on them with the Act of Union in 1800, and they were compelled to contribute to its support. Even after the political disabilities were removed from the Catholics, in 1829, the Irish Church continued to be a drain on them, and not until 1871 was it finally disestablished. To-day, therefore, there is no State Church in Ireland, but about seventy-four per cent of the population belongs to the Roman Catholic Church. However, in the northern province of Ulster, there are large numbers of Episcopalians and Presbyterians, the descendants of Englishmen and Scotchmen who settled there long ago, and the Methodist Church also has a considerable following in the northern counties. Indeed, in Ulster the adherents of these three Protestant Churches combined decidedly outnumber the Catholics. With the decrease in population, it has been the Catholics who show the greatest loss, for far more of them emigrate than Protestants.

Education. The religious question has made difficult the establishment of any system of education for Ireland. The tendency of the British government was to make all schools Protestant in tone, and, naturally, the Catholics would not allow their children to attend such schools. An attempt was made to remove the difficulties by having the secular

teaching of Catholic and Protestant children conducted together, while religious instruction was imparted separately, but this compromise did not prove satisfactory.

Previous to 1922, the education of all Ireland was in the hands of various boards and commissioners. In Northern Ireland, these bodies are now consolidated under the Ministry of Education, and a system of local control for all forms of education throughout Northern Ireland has been set up. In the Irish Free State, elementary education is given free in the national schools, which are subject to the control of the Department of Education. The secondary schools are under private control; and in many cases they are conducted by religious orders. Since the establishment of the Irish Free State, a great movement for the revival of the Irish language has developed. As a result, the Irish language has been included as an essential part of the curriculum for all national schools, and a large sum of money has been spent in preparing the instructors for this important new subject.

Among higher institutions may be mentioned the University of Dublin (Trinity College), which dates from 1591; and the National University of Ireland, founded in Dublin in 1909 with three constituent colleges of Cork, Galway, and Dublin, all three coeducational institutions. In Northern Ireland there is the Queen's University of Belfast, founded in 1849, and reconstructed as an independent university in 1909.

The Cities of Ireland. The two largest cities, Belfast in Northern Ireland, and Dublin, the capital of the Irish Free State, are treated in separate articles in alphabetical order in these volumes. Londonderry is an historic city of Northern Ireland; Cork, Galway, Kilkenny, Limerick, and Waterford are all cities of the Irish Free State. Killarney and Queenstown, although not large enough to be classed as cities, are also described here because of their fame.

Cork, the most important city in the south of Ireland, capital of the county of the same name. The name is derived from the old Irish word *Corroch*, meaning *swamp*, in reference to the nature of the land on which the city is built. It is situated on both banks of the River Lee, 165 miles south of Dublin. The river is navigable from the sea for a few miles above the city, and great sums of money have been spent in harbor and dock improvements. The place has large iron foundries, a Ford automobile factory, shipbuilding yards, and manufactories of leather, paper, woolen, and linen goods. In the latter it excels. Eleven miles distant, at the mouth of the river, is the port of Queenstown, or Cobh (see below).

During the war between Charles I and Cromwell's forces, Cork strongly supported King Charles. It was captured and its people were severely punished by Cromwell. To the present day, the Irish of Cork and its vicinity refer to him with bitterness. Most of

the inhabitants are Roman Catholics. The city presents a fine appearance, and its suburbs contain many fine residences. Population, 1926, 78,468.

Galway, the capital of Galway County, is a seaport on the north shore of Galway Bay, 130 miles directly west of Dublin. From its excellent harbor are sent cargoes of agricultural produce, marble, fish, bacon, and kelp; its industrial plants include flour mills, brush factories, breweries, and foundries. One of the university colleges (see *Education*, above) is located at Galway. Population, 14,000.

Kilkenny, a town of County Kilkenny, about eighty miles southwest of Dublin. Among its famous buildings are the Anglican Cathedral of Saint Canice, the ancient Abbey Church of Saint John's, called the Black Abbey, and two ancient monasteries. Blankets and linen and woolen cloth are the chief manufactures; large marble works near the town and coal mines near by employ many of the citizens. Population, 11,000.

[The well-known expression, "to fight like Kilkenny cats," is said to have originated in the acrimonious quarrels over boundary lines, carried on in the seventeenth century by Kilkenny and the neighboring Irishtown. Dean Swift wrote a satire on the towns, in which the Kilkenny cats were described as fighting until only their tails were left.]

Killarney, *kil ahr' nie*, a small market town of Ireland, in the County of Kerry, 185 miles southwest of Dublin. One and one-half miles distant cluster the three connected lakes to which this little town has given its name, and which are famed in Irish song and story. These lakes are situated in a basin in the midst of the mountains of Kerry, some of which, rising abruptly from the water's edge, are enveloped in a wealth of trees from base to summit. Many richly wooded islands contribute to the picturesque grandeur of the lakes. Midway in the course of the curiously winding stream which connects the lakes is a famous echo, caused by a lofty rock known as Eagle's Nest.

Limerick, *lim' ur ik*, fourth in importance among the seaports of Ireland and the leading port on the west coast. It is the capital of Limerick County, and is built on both sides of the Shannon River, about 106 miles south-southwest of Dublin. The town is divided into three parts, the English town, the Irish town, and Newtown-Pery, the latter dating from 1769. It is now the finest portion of the city. The industries include the curing of bacon, flax-spinning and -weaving, and lace-making.

In the ninth century, Limerick was an important Danish settlement and remained so until the Danes were expelled by the Irish two centuries later. The last stand on behalf of James II was made at Limerick, and when the city capitulated to the army of William of Orange, by the terms of the Treaty of Limerick the greater part of the Irish army was permitted to enlist in the military service of France, and the Roman Catholics were guaranteed full religious and political liberty. The violation of the civil part of this treaty during the reigns of William III and Queen Anne, down to the nineteenth century, has given to Limerick the name of the "City of the Violated Treaty." Population, about 41,000.

[For the origin of the term *limerick* as the name of a nonsense verse, see *LIMERICK*.]

Londonderry, the capital city of County Londonderry, in Northern Ireland, 144 miles northwest of Dublin. It is built on a hill overlooking the Foyle

River, and the ancient city walls still stand, although their limits were outgrown long ago. Brewing, tanning, and the making of linen constitute its chief manufactures, and it is the center of a considerable coastwise and ocean commerce. Population, 40,000.

Queenstown, renamed COBH by the Free State, is the seaport of the city of Cork, on the south side of Great Island. The town is built in a semicircle facing Cork Harbor, and the streets rise one above the other like the seats in an amphitheater. The town of Cobh is not important industrially; it is chiefly a winter resort and an admiralty station. Originally, it was merely a fishing village, but during the Napoleonic wars, it was made the port of embarkation for soldiers, and is now a port of call for American mail steamers. Features of special interest are the large navy yards, protected by three forts, a government emigration station, and the famous Royal Cork Yacht Club. Population, 1926, 8,000.

Waterford, an important trading point on the southern edge of the Irish Free State, situated twelve miles from the sea on the right bank of the Suir River. Small trading vessels can reach the city; larger ships unload their cargo at a point six miles nearer the sea. Much of the trade is with England, and the chief exports are food products. There are shipbuilding yards, distilleries, breweries, flour mills, etc. The city has Protestant and Roman Catholic cathedrals, a Roman Catholic college, and numerous public institutions for the care of the mentally and physically afflicted. Population, 28,000.

Physical Features

Irregularities of Coast and Surface. A very old historian writes of Ireland that this island, "lying a-loose upon the Western Ocean, in shape resembleth an egg, plain on the sides, and not reaching forth to the sea in nooks and elbows of land as Brittain doeth"; but a glance at the map will show his error. On the east, probably the only shore known to this early writer, there are, it is true, long stretches of fairly straight coast, but the western outline is bold and rugged, marked with numerous indentations. These are fiords, or drowned valleys, like those of Norway, and here and there along the coast are rocky islets, the projecting peaks of mountains long ago submerged. This western coast of Ireland, with its hills running down to the sea, has of late years been much visited by tourists, and occasional resort-towns have sprung up. The total coast line of the island is almost 3,000 miles.

Though it is in the west that the mountains approach the sea most closely, it is true of the island in general that the highlands follow the coast. This does not mean that there is a continuous ridge, for Ireland has no such thing as a mountain range; but most of the isolated masses are plainly visible from the sea. At places in the northwestern counties, cliffs of solid rock 2,000 feet in height rise sheer from the water, an awe-inspiring sight to the sea voyager. As in England, the highest mountain



UPPER AND LOWER LAKES OF KILLARNEY

Photo: U & U

3521



WOMEN GATHERING PEAT

In Ireland the areas of carbonized turf are in some places several miles in extent. Many of the trenches such as shown in the illustration are half a mile long. In the background the peat blocks are stacked, awaiting transportation.

peak, Carrantuohill, 3,414 feet in height, is in the picturesque lake region.

Within the walling mountains is the central plain of which the bogs, the most characteristic physical feature of Ireland, make up a large part. Dreary, brown, totally unfitted for cultivation, this bogland is not unhealthful, as are many swamp regions. It supplies the Irish people, too, with much of their fuel, for from it are cut the blocks of peat—vegetable matter submerged for a long time, but not long enough to become coal. See PEAT.

The Waters of Ireland. From the central plain rivers flow in all directions to the sea, finding their way through the gaps in the marginal highlands. No dominating mountain mass forms a watershed, and the rivers often have winding, tortuous courses. Many of them widen into series of lakes, notably the Shannon, the longest river in the British Isles. This drains the central part of the plain, and is navigable for much of its course of 250 miles. Other rivers of importance are the Boyne, near which was fought a memorable battle; the Erne, another river with chains of lakes in its course; and the Lee, which forms with its estuary the harbor of Cork. Many of these

streams, and other smaller ones, are important means of intercommunication, even in these days of extensive railroads.

The lakes of Ireland, or *loughs*, as the Irish call them, are very numerous and, in proportion to the size of the island, of considerable extent. Lake Neagh, in the northeast, is the largest lake in the British Isles, having an area of 158 square miles; but the Lakes of Killarney, in the southwest, are the most famous, because of the exquisite beauty of their surroundings. In the central plains, the innumerable lakes have little beauty, being but sluggish pools dark with peat, but they are favorite haunts of fishermen, for numerous trout are found in their shadowy waters, and fish constitute no inconsiderable portion of the food of the people in many localities.

Climate, and Plant and Animal Life. It is the Atlantic Ocean which has most to do in determining the climate of Ireland. From it blow those moderately mild winds which prevent extremes of temperature, making the average for the winter from twenty to thirty degrees higher than it is in the same latitude in North America or Eastern Europe, and that for the summer from five to ten degrees lower.

The mean temperature for the year is about 50°, that for the winter being 40° and that for the summer 60°. Rainfall is everywhere plentiful, and to this is due the brilliant green of the foliage which gave rise to the name the "Emerald Isle."

The vegetation of Ireland presents few distinctive features save its vivid greenness, practically all of its plants being related to those of England and the near-by Continent, and the same is true of the animal life. One lack there is in the animal life which must be noted—there are no snakes in Ireland. Saint Patrick drove them into the sea, says the popular tradition, but scientists find nothing strange in the absence of snakes, since Scotland has none, and England has but two species.

Resources and Industries

Minerals. A country which has not an adequate supply of coal is seriously hampered in its industrial development, and Ireland has this disadvantage. Coal measures exist in almost every province, some of them of considerable area, but much of the coal is of so inferior a quality that it scarcely pays for mining. Usually, the total yield of the mines is under 100,000 tons a year, and fewer than 800 people are employed in them. This lack of coal is especially to be regretted, since Ireland has extensive deposits of iron ore which cannot be utilized because of the absence of fuel. The output of other minerals is of no importance save for marble and other stones.

Manufactures. Naturally enough, with this lack of fuel, manufactures have not flourished in Ireland, and the measures forced upon the island by England during their earlier connection made conditions still more unfavorable. The government of the Irish Free State realized that manufacturing must be developed to offset the unbalanced condition which the emphasis on agriculture produced. It therefore adopted the policy of aiding in the development of rural industries, especially those concerned with agricultural produce. It endeavored to encourage industry by means of subsidies, the development of cheap sources of power, and by making provision for credit facilities. In Northern Ireland, manufacturing has always held a place of great importance. One-third of the world's flax-spinning capacity is represented in Northern Ireland. The chief manufactured product of all Ireland is linen, which is of a whiter, more delicate texture than that made elsewhere. The linen and allied industries center in Ulster, and especially in Belfast, and their total products amount in a year to about \$75,000,000.

Belfast is also the center of the Irish ship-building industry, and its annual production equals, if it does not surpass, that of any other yard in the world. Other industries of im-

portance are brewing and distilling, woolen manufacture, and such home pursuits as the making of lace and embroidery, for which certain sections are famous.

Fisheries. Although the fisheries are one of the most important natural resources of the country, little has been done until recent years to develop the industry. The inland fisheries provide some of the finest salmon- and trout-fishing in the world, but between 1890 and 1916 there was a steady decrease in the number of men and boats engaged in the business. The Irish Free State established a separate Ministry to develop the fisheries, and the government helped by making loans for boats and by subsidizing fishing schools.

Agriculture. This is, and always has been, by far the most important industry in Ireland, and its prosperity has fluctuated according to agricultural conditions. The natural advantages are considerable, for there are large stretches of cultivable land with a deep, rich soil, and the climate is favorable to most temperate-region crops. But the Irish people have not always been allowed to reap the benefit of these advantages. Centuries ago, much of the best land was parceled out in large estates among the conquering English, frequently non-residents, and by them it was rented on oppressive terms to Irish tenants. Much of the soil was soon overcultivated, and so became exhausted. Subsequently, conditions decidedly improved. Large tracts of land were withdrawn from tillage and given over to pasturage, for which purpose the rich growth of grass is peculiarly adapted.

To-day, the largest acreage is devoted to oats, and the next largest to potatoes, the chief food crop. Wheat, once a crop of great importance, has now sunk to minor rank, but barley is still grown in large quantities, and in the north, near the linen-making district, there are broad fields of flax. Vegetables and small fruits make up a considerable acreage, and hay is cut in certain sections.

As indicated above, stock-raising is of ever-increasing importance. Indeed, there are to-day in Ireland more head of cattle in proportion to area than in any other country of Europe, with the possible exception of Denmark. The young cattle are exported in great numbers to England, and are there fattened for market. There are almost as many sheep in the island as cattle, but there are less than one-third as many pigs, though that animal has long been considered the Irishman's particular property. Excellent horses are also raised in Ireland, both of the cart-horse and of the hunter type, and there was a great demand for them at the outbreak of the World War in 1914.

A great improvement was made when an association in aid of agriculture, called the

Irish Agriculture Organization Society, was established in 1899. It took as its objects experiments as to the best location and methods for certain crops; the instruction of the people, especially the young men and women, on agricultural subjects; the betterment of livestock; and, above all, coöperative purchasing and marketing. This association has always been entirely independent and free from government control. From year to year, the government of the Irish Free State has continued grants to the society, but after the first year, the government of Northern Ireland discontinued its grants to the Ulster division of the society. As further aid to the farmers, the Irish Free State set up a Ministry of Land and Agriculture and a commission on agriculture.

Transportation and Trade. The rivers and canals which served for transportation before the extensive building of railways began have not been allowed to fall into disuse, and are to-day of the greatest importance. Dublin, the capital city of the Irish Free State, is connected by canals with the Shannon, and shorter canals join practically all of the important streams. In Northern Ireland there are over 180 miles of canals. By an amalgamation of numerous small railways of the Irish Free State, which took place in 1924 and 1925, an excellent system of railways has been established. The total number of miles of railway in the island is 3,788, over a thousand more than that possessed by Maine, the state which it most resembles in size.

Several steamer lines, from Belfast, Dublin, Waterford, and Cork, connect Ireland with Great Britain, and American steamers make Cobh (Queenstown) a port of call. The commerce of Ireland is considerable, the imports and the exports each totaling more than \$300,000,000 a year. Most of the exports, which consist largely of livestock, linens, liquors, meat products, and dairy products, are sent to Great Britain, but other countries, including the United States, send to Ireland vast quantities of farm products. Belfast, in Northern Ireland, has the largest trade of all the cities of Ireland (see BELFAST).

The Two Governments and Constitutions of Ireland

After 1801, the year of the Act of Union (see *History*, below), Ireland was an integral part of Great Britain, and had no Parliament of its own. It sent, instead, 103 representatives to the British House of Commons, and twenty-eight peers, elected for life, to the House of Lords. Never at any time were the Irish satisfied with such complete amalgamation with England, and the agitation for Home Rule was kept up with varying intensity. In 1914, after years of struggle, a Home Rule Bill was actually passed, but it was not accepted by the

Irish Protestants of Ulster, and violent dissension was the result. The outbreak of the World War in that year united Ireland in defense of Britain, but it also made necessary a postponement of the actual Home Rule arrangements. After a period of grave disorder, in which there was bitter fighting between Sinn Fein troops and the British "black-and-tans," England offered Southern Ireland a Dominion status similar to that of Canada. In December, 1921, a treaty was signed with the British government, which was embodied in the Irish Free State (Agreement) Act of 1922. This act declares that the Irish Free State is to have the same constitutional status as the self-governing Dominions; that its relation to the Imperial government corresponds with that of Canada; and that the representative of the Crown in Ireland is to be appointed in the same manner as the Governor-General of Canada. (Actually, this official has no real power in the government.) In 1926, by virtue of the declarations of the Imperial Conference, the Irish Free State was recognized as one of the self-governing units of the British Commonwealth of Nations (see *History*, below).

Under the Government of Ireland Act of 1920, Northern Ireland was given a separate Parliament and government, and when the Irish Free State was established, it exercised its option of continuing its separate existence. In December, 1925, the British government and the two Irish governments signed an agreement by the terms of which the partition of the island as agreed upon in 1920 was made permanent.

Constitution of the Irish Free State. Under the treaty of 1921, a provisional government was constituted on January 16, 1922, to function for one year. The Provisional Parliament having met in September to adopt a Constitution, this document was accepted by the Parliament and the British government, and went into effect by royal proclamation, on December 6, 1922. It provides for universal suffrage, freedom of religious opinion, and the right of association. The legislature consists of the king, Chamber of Deputies (see DAIL EIREANN), and Senate (Seanad Eireann). The number of Deputies, which is based upon population, is 153, including the Speaker. This official is automatically returned to power, unopposed. The term of the Dail was originally for four years, but a subsequent amendment extended it to six years. Originally, too, both houses were elected on a basis of proportional representation, but the Constitution was further amended in 1928, and the Senate is now chosen by members of both houses, in joint session. There are sixty members of this body, elected for terms of nine years. One-third of these are to go out of office every three years.



Photo: U & U

Farm Scene in County Kerry. Not all Kerry farmers are as prosperous as this man and wife appear to be. Most of them live in small cabins, and incomes are pitifully small in this part of the Free State.

The executive department consists of an Executive Council of not more than twelve (originally seven) members, including a President, a Vice-President and Minister for Justice (one office), and other Ministers corresponding to the usual officers of a Cabinet. The position of President of the Council is analogous to that of Prime Minister. The Council members must be members of the Dail and are responsible to it. The Dail nominates the President, who, in turn, nominates the Vice-President and other Council members, but the latter must be approved by the Dail. Ministers outside the Executive Council, including those who head the departments of agriculture, fisheries, and posts and telegraphs, are said to

be *extern*. These are nominated by the Dail, and are responsible to it.

Constitution of Northern Ireland. The legislature of Northern Ireland consists of a Senate of twenty-four members and a House of Commons of fifty-two members; the membership of both houses is elective. The executive power is vested in the Governor on behalf of the king; he holds office for six years and is advised by Ministers responsible to Parliament. Senators hold office for a fixed number of years; the House of Commons continues for five years, unless sooner dissolved. The Parliament may legislate on any question not of concern to the British Commonwealth of Nations as a whole.

History of Ireland

The Very Olden Times. No man can say who the first inhabitants of the island were, nor when they lived. Centuries before Christ, Greek and Roman writers referred to the island of *Ierne*, or *Hibernia*. But the dawn of authentic history came in the fourth century A.D. The lords of Ireland in that day were the *Scoti*, a Celtic tribe who were strong enough to make raids on Britain, then under Roman rule, and even to cross the Channel to Gaul.

Barbarians these early people were, but not in the sense of the earliest inhabitants, who knew not the use of metal or even of fire; for the *Scoti* possessed the rudiments of agriculture and had definite systems of government and religion. Each of the numerous provinces had its king, and all these were in a measure subject to the king of the central province, Meath; and each clan had its chief. At the head of the religious system were the Druids, those priests about whose name so much mystery hovers.

The First Great Event. The coming of an unarmed priest who to-day is Ireland's patron saint—Saint Patrick—was the first great event of Ireland. About 432, it is believed, he came to the island, and despite obstacles did a work little short of miraculous, in spreading among a pagan population the doctrines of Christianity. The Irish did not become mere passive converts. They were swept by a passion for missionary labor, and from their newly established monasteries missionaries in great numbers went out to Britain and to the Continent, and did a wonderful work. Students, too, thronged to Ireland and sought education in its monasteries, and for a time, as one historian says, "The new religious houses looked for their ecclesiastical traditions not to Rome but to Ireland." At no subsequent time has Ireland played so great a part in the history of the world.

The Coming of Invaders. This religious progress, which seems to have been attended

by little of secular progress save in the art of music, met a rude check in the last decade of the eighth century in the coming of the black Viking ships, with their hordes of Danes and Norsemen. The Scandinavian tribes established themselves on the coast, building or occupying Cork, Waterford, Limerick, and Dublin, and took to ravaging the country, finding particular delight in plundering the monasteries. It is probable that the famous round towers of Ireland were built in the eighth and ninth centuries and were used as defenses against these fierce invaders. For more than two centuries the Danes harassed the island, but in 1014 they were overthrown by a celebrated hero, Brian Boromhe, more commonly known as Brian Boru. Brian brought almost all of the island under his rule, but he fell in the very moment of his victory, and the island slipped back into anarchy again. Says an old rhyme:

Each man ruled his own tribe,
But no man ruled Erin.

For more than a century and a half this state of things continued, with scarcely a gleam of light in the darkness and misery; and then came the English, and a new phase in Ireland's history began. Pope Hadrian IV had given Henry II of England permission to subdue the island, and when Dermot MacMurrough, a deposed Irish king, took refuge at the English court and asked aid, Henry allowed him to call for volunteers among the English. The leader of these volunteers was Richard, Earl of Pembroke, best known as "Strongbow," who placed Dermot again on his throne, married his daughter, and later succeeded him. Other Norman nobles settled in the island, and when, in 1172, Henry II landed at Waterford, he was greeted as "lord of Ireland."

Relation of the Two Islands. The Norman nobles and their followers received from the king great grants of land, and after they had

put down the opposition of the natives, they allied themselves with the latter, and began to defy the power of the king. Adopting the customs and language of the natives, they became more Irish than English, and the hold of England on the island grew weaker. In time only the region about Dublin—the "Pale" as it was called—felt the English influence. Under Henry VII, a strong king, there was a change. Sir Edward Poynings, a man with English interests at heart, was placed in charge, and he put through several measures looking toward the strengthening of English control, most important of which was the law which made the Irish Parliament dependent on the king. It must not be forgotten that throughout all this time the mass of the Irish people was scarcely civilized, and could hardly be expected to understand English laws and customs.

Henry VIII was for the most part very wise in his dealings with Ireland. He provided that Irish law and not English should be enforced in the untamed districts outside of the Pale, and he allowed representatives from these regions to become members of Parliament. It was this mixed Parliament which in 1541 conferred on him the title of King of Ireland. But to the religion of the island, Henry was not so kindly. In his attempt to enforce the reformed faith which had been introduced in England, he had the monasteries destroyed and their wealth confiscated, purchasing the good will of the Irish chiefs by sharing these riches with them. The Protestant Edward VI and the Catholic Mary in turn pressed their faiths on Ireland, which felt these changes of religion very little, however, and when Elizabeth came to the throne, she planned for the island some such wise policy as her father had pursued. But a rebellion headed by the Irish chieftain, Shane O'Neill, had to be put down with violence, and thereafter Elizabeth did not return to her conciliatory policy. The whole island suffered. Villages were plundered and burned, crops destroyed, cattle and even people were put to death in great numbers, and it is estimated that at least one-third of the inhabitants had perished before the close of the struggle. The lands were distributed among English nobles, and Ireland entered upon a distinctively English period. The Anglican Church, hated by practically all the people except the English of the Pale, was made the established Church, as in England, and Catholics were denied all rights and excluded from all public offices.

Increasing Disaffection. Under James I and Charles I, the confiscation of land and the suppression of the Catholics went on, and the colonization of Ulster by the Scots, so strong a factor in present-day Irish history, was begun. Charles's viceroy, the Earl of Strafford,

by his "thorough" policy, reduced the land to order, but when his strong hand was removed, a rebellion broke out, in which the greatest atrocities were committed on both sides. The Irish might have made a substantial change in their condition had they known how to make the most of their successes, but dissensions broke out among them of which the English were not slow to take advantage. Not until Cromwell won victories with his "New Model" army, in 1649, was the island really reduced. New confiscations of land took place, and more and more English became landowners in Ireland. This gave rise to a strange condition. Although the majority of the Irish people were Catholics, almost nine-tenths of the land was held by Protestants. Indeed, by laws passed shortly after this time, a Catholic was made incapable of acquiring land, as already he was incapable of holding any sort of public office.

When James II, a Catholic, became king of England, he favored the Catholics in Ireland. As a result, he found enthusiastic supporters when, after his deposition by William and Mary, he went to the island. In 1690 there took place the Battle of the Boyne, in which James was completely defeated, and by the next year, Ireland was again completely subdued. According to the terms of the treaty, Irish Catholics were to regain possession of much of their land and were to be allowed, in a measure at least, religious liberty. But the Parliament of England and that of Ireland, of which the English Protestants were in control, refused to abide by these terms, and the cruel laws that were passed crushed the infant industries of the island and forced many of the better class of the inhabitants to emigrate. This first half of the eighteenth century is the darkest period of Irish history.

The Struggle for Better Conditions. Naturally, the Irish did not accept these conditions tamely, and frequent insurrections resulted. Finally, in 1778, the Irish Parliament by a Relief Act lifted a little of the crushing weight, giving to Catholics the right to hold land and to practice their religion. The Irish Protestants joined with the Catholics in a demand for legislative freedom, and as they backed their demand with an armed force and had at their head the patriot Grattan, they gained their point, and in 1782 the Irish Parliament was declared independent. The methods of gaining seats in this Parliament, however, were in sore need of reform. Moreover, it was composed entirely of Protestants.

In 1798 the Irish again revolted, stirred by the excitement of the revolution in France. The rising was put down, but it had made clear to the English that Ireland in its existing condition could be nothing but a hotbed of insurrection. William Pitt, Premier of Eng-

land, thought he saw the way out of the difficulty, and proposed a legislative union of the two countries, and the emancipation of the Catholics. The Act of Union passed both Parliaments, and on January 1, 1801, "The United Kingdom of Great Britain and Ireland" was proclaimed.

Early Years of the Union. Catholic emancipation did not follow, and the Irish, little pleased with the union with Great Britain, were rendered still more dissatisfied. The struggle for freedom, religious and political, which began then did not approach settlement until the second decade of the twentieth century. The first rising that took place attracted considerable attention because of the picturesque character of its leader, Robert Emmet, but it accomplished nothing. The main contention in these early years was for Catholic emancipation, and the chief leader was the able and patriotic Daniel O'Connell. In 1829 the government found itself unable to resist further, and Catholics were given the right to hold office and to sit in Parliament. They were still forced to pay

tithes to the Established, or Anglican, Church, which the Catholics hated bitterly, and not until 1871 was disestablishment brought about.

The reforms of 1832 in England helped Ireland a little, but not enough to quell the demands for Home Rule, and about 1841 open insurrection was narrowly averted. Between 1845 and 1847, the suffering of Ireland came to a climax. The potato crop failed; upon this the poorer people depended almost entirely, and famine resulted. Thousands died, hundreds of thousands emigrated, and the population of the island has never recovered from this loss. Gradually, the English leaders came to look with greater favor on the pleas of Ireland, and certain reforms were carried out in the land laws which relieved the distress, and agricultural and industrial conditions improved decidedly; but it was something more thorough-going that the Irish were fighting for, and the struggle for Home Rule became more and more intense.

Later Phases of the Home Rule Question. It is the Home Rule question which has dominated Irish political history through the last half-century. In 1886 Gladstone became Prime Minister of England, and at once introduced

a bill providing for legislative independence, or, as it is more commonly called, Home Rule. This was rejected, as was another which he brought forward seven years later. Other acts for the advancement of Ireland, however, were more successful. The establishment of a department of agriculture; the Local Government Act of 1898, and above all, the Land Purchase Bill of 1903, which declared that tenants might purchase their holdings from the great landlords, worked decided and lasting changes, but still did not satisfy. In 1912 a third Home Rule Bill, officially known as the Government of Ireland Bill, was introduced by Premier Asquith, with the effect of stirring up immediate protest in the Irish province of Ulster. For the Protestant population of that province did not desire Home Rule, preferring rather

"equal citizenship in the United Kingdom" than rule by the Catholic majority.

Twice the Home Rule Bill passed the House of Commons and was rejected by the Lords, but on its third passage by the House, in 1914, it became a law according to the Parliament Act of 1911, which allowed the lower



RESIDENCE OF THE UNITED STATES MINISTER

Before the organization of the Irish Free State, the building was the home and office provided by the British government for the Undersecretary for Ireland.

Photo: U & U

house to pass a bill despite the continued disapproval of the upper [see GREAT BRITAIN (Government)]. But the excitement was by no means allayed, for the Ulster Unionists refused to be bound by the terms of the bill, and various amendments were introduced excluding Ulster from the jurisdiction of the new Irish Parliament. But Ulster is not all Protestant, and its Catholic inhabitants were enthusiastic Home-Rulers. It seemed as if nothing could avert civil war, but the outbreak of the World War brought about an immediate truce.

The World War. Upon the outbreak of the war, it is said, Germany believed that Great Britain would not be drawn into the conflict because it would face revolt and civil war in Ireland over the exciting Home Rule campaign. The diplomatists of Germany doubtless counted upon England's internal troubles to keep that great power neutral, but such conclusions were quickly shattered. When Britain was put in peril, the Irish dropped their political differences and thousands of volunteers joined the armies destined for service in France, Belgium, Egypt, Asia Minor, and the Balkan Peninsula. In 1916, when conscription was ordered, Ireland

was excluded from the provisions of the act, for the Irish leaders in Parliament convinced the government of the wisdom of such exception. In April of the same year, a rebellion, led by armed members of the Sinn Fein Society (see SINN FEIN), broke out in Dublin, but it was promptly quelled by the British authorities. Over 500 people were killed in the course of the rebellion, and several million dollars' worth of property destroyed. Sir Roger Casement, the chief leader of the uprising, and several of his confederates were found guilty of treason and were executed.

The Critical Period. After the close of the war, the agitation for Home Rule was revived with vigor, and the Irish question presented a more serious aspect in 1921 than ever before. Under the leadership of Eamon de Valera, proposals for a Dominion had been rejected and an Irish republic proclaimed, in 1919, with him as President. The slogan, "Ireland her own and all therein, from sod to sky," led to a state of civil war which threatened the very existence of the people of the southern counties. English troops were constantly employed in attempts to uphold the royal government. Finally, Premier Lloyd George proposed a conference, "to explore to the uttermost" the possibilities for peace, and the outcome, as related above, was the establishment of the Irish Free State under a government distinct from that of the six northern counties.

Progress Toward Law and Order. The inauguration of a constitutional government in Southern Ireland, after so many years of turmoil, was not an easy matter. The task of the new régime was complicated by the hostility of the Republican party, which, under the leadership of De Valera, remained irreconcilable, denouncing with especial bitterness that provision of the treaty of 1921 requiring Parliament members to swear allegiance to King George. Other Sinn Fein leaders, including Arthur Griffith and Michael Collins, believed that the best interests of Ireland would be served by acceptance of the treaty, and they persuaded the Dail Eireann to ratify it. In the provisional government, Griffith served as President and Collins as Premier. Though 60,000 British soldiers left Ireland, never to return, and the Irish had gained a measure of freedom far beyond their hopes in 1914, De Valera's party began a civil war, fighting now against their own countrymen. On August 12, 1922, President Griffith died of heart disease, and ten days later, Premier Collins was assassinated by Republican sympathizers. These reverses strengthened the Free State cause, however, and in December the permanent government was inaugurated, with William T. Cosgrave as President of the Executive Council.

In 1923 the De Valera faction decided to abandon its guerrilla warfare, and in September of that year, a new Parliament began to function, in which the government party had a working majority. Forty-four members of the Republican party, however, who had been elected to the Dail, refused to take their seats. On September 10 the Irish Free State was admitted to the League of Nations, and its representatives used the Gaelic language in the assembly of that body. The work of establishing financial security and improving economic conditions went steadily forward, and by 1927 constitutional government had triumphed.

The policy of abstention from Parliament, pursued by the De Valera faction, was abandoned in that year. In May, 1927, President Cosgrave's government, which had been continuously in power since 1922, dissolved Parliament and appealed to the country for a vote of approval. In the June election, the De Valera wing of the Republican party (Fianna Fail) polled an unexpectedly large vote, so that, with the votes of minor parties—Farmers, Independents, Labor, Sinn Fein (Extreme Republicans), and others—the government lacked a majority, with less than one-third of the total number of seats in the Dail. This situation was offset, however, by the refusal of the Republicans to attend the sessions. The murder of Kevin O'Higgins, Vice-President and Minister of Justice, shortly after Parliament convened, wholly changed the situation. Stirred by this act, the government had a bill passed which increased its power to deal with lawlessness, and enacted another which compelled every candidate to accept the oath of allegiance on election. This latter measure forced the hand of the Republicans.

In August, therefore, the Fianna Fail Deputies announced that they would enter the Dail, but that they regarded the oath as an "empty formality." The year 1927 thus marks the adoption of constitutional methods of opposition on the part of the Republicans. In the new Parliament, an effort was made to put through a vote of lack of confidence in the government, but the latter was saved by one vote, that of the Speaker. To clarify the situation, Cosgrave again dissolved Parliament and called a new election for September. In this balloting, both of the leading parties gained at the expense of the minor groups. Cosgrave was reelected President of the Council, and proceeded upon a vigorous constructive policy.

The stability of the country was shown, in 1928, by the successful flotation of a national loan, the reduction of the adverse trade balance, and an increase in revenue. Another source of satisfaction was the establishment of

OUTLINE AND QUESTIONS ON IRELAND

Outline

I. Location and Size

- (1) Latitude
- (2) Longitude
- (3) Position with reference to Great Britain
- (4) Size

II. Physical Features

- (1) Coast
- (2) Surface characteristics
 - (a) The coastal highlands
 - (b) The central plain
- (3) Rivers and lakes
- (4) Climatic features
 - (a) Dependence on surrounding waters

III. Industries

- (1) Agriculture—the chief industry
 - (a) System of land tenure
 - (b) Irish Agriculture Organization
 - (c) Chief crops
 - (d) Stock-raising
- (2) Mining
- (3) Manufacturing
- (4) Fishing

IV. Commerce and Transportation

- (1) Steamship lines
- (2) Exports and imports
- (3) Chief countries traded with
- (4) Rivers, canals, and railways

V. The People

- (1) National characteristics
- (2) Population statistics
- (3) Social conditions
 - (a) Education
 - (b) Religion
- (4) The cities of Ireland

VI. History and Government

- (1) The beginnings
- (2) Coming of Christianity
- (3) Foreign interference
- (4) The long struggle with England
- (5) The Act of Union
- (6) The Home Rule question
- (7) The World War
- (8) The two governments
- (9) Progress of the Free State

Questions

Have the Free State and Northern Ireland any political relations in common?

What manufactured product does Ireland make in greater perfection than any other country?

What was the "first great event" in the history of the island?

Why do scientists not consider it strange that Ireland has no snakes?

Who were the Druids, and what did they have to do with Ireland?

What does *Sinn Féin* mean? What part did an organization bearing that name play in the history of Ireland?

What distinction has Ireland as to the length of its longest river and the size of its largest lake?

Why did not all Ireland welcome Home Rule?

From the map, show the error of an early chronicler in describing the shape of Ireland.

How has the religious question interfered with the progress of education in Ireland?

How many states of the American Union have a larger population than Ireland? How many are more densely populated?

What is meant by the "disestablishment" of a Church? When was the English Church disestablished in Ireland?

For what is the Boyne River famous?

What people of continental Europe do some of the Irish peasants resemble in temperament?

What effect did the World War have on the government of Ireland?

a factory at Cork for the manufacture of Ford automobiles.

In the British Imperial Conference, which met in London in 1926, the Irish Free State had its representative in the person of President Cosgrave. The virtual independence of each of the self-governing units was given formal recognition (see BRITISH EMPIRE, AND BRITISH COMMONWEALTH OF NATIONS), and the title of the king was changed to make it conform to the status of the Irish Free State:

George V, by the Grace of God, of Great Britain, Ireland, and the British Dominions Beyond the Seas

Related Subjects. The following articles in these volumes are related more or less closely to certain phases of the geography, history, or life of Ireland:

CITIES AND TOWNS

Belfast Dublin

HISTORY

Cosgrave, William T.	O'Connell, Daniel
Cromwell, Oliver	Parliament
Davitt, Michael	Parnell, Charles Stewart
Druids	Patrick, Saint
Emmet, Robert	Round Towers
Gladstone, William E.	Strafford, Earl of
Henry (VIII, England)	Valera, Eamon de
Home Rule	World War

LEADING PRODUCTS

Barley	Oats
Flax	Potato
Linen	Ship

WATERS

Irish Sea	Saint George's Channel
Killarney (lakes)	Shannon

UNCLASSIFIED

Blarney Stone
Dail Eireann
Giants' Causeway
Hibernia
Irish Literature
Limerick
Shamrock
Sinn Fein

IRELAND, JOHN (1838-1918), archbishop of Saint Paul, Minn., from 1888 until his death, was an influential factor in colonizing the Northwest and in establishing the Catholic University in Washington. To his many reform movements he brought the enthusiasm, energy, and ability of a natural leader. He was born in County Kilkenny, Ireland, and was educated for the priesthood in France.

for the cause all over the United States and carrying the battle into Ireland and Great Britain. From the liquor problem he turned his attention to the evils of congestion of immigrants in tenements. He purchased two great tracts of land in Western Minnesota, and within the first year succeeded in placing over 900 Catholic colonists on prairie farms. He was an aggressive American, to whom his Church was indebted for many of its large activities, social as well as spiritual.

IRENE, EMPRESS. See BYZANTINE EMPIRE.

IRIDIUM, *i rid' ih um*, one of the rare precious metals of the platinum group. It is about twenty-two times as heavy as water, and is the hardest of the pure metals, being harder and more brittle than platinum (which see). Because of its scarcity and hardness, it sells for more per ounce than does platinum. Iridium is a whitish metallic element found in alluvial deposits in association with platinum, and takes its name (from *Iris*, the *rainbow*) from the variety of colors it displays when dissolving in hydrochloric acid. It is the most common alloy with platinum; this extremely hard compound is used to make chemical utensils, contact points, standard weights and measures, points of fountain pens, and surgical instruments. The symbol of iridium is *Ir* (see CHEMISTRY).

T.B.J.

IRIS, the name of a genus of beautiful flowering plants widely distributed in temperate regions. The irises have marked characteristics and are easily recognized. In the typical forms, the leaves, rising from bulb or rootstock, are narrow and erect, like blades of grass; the



Photo: U & U

ARCHBISHOP IRELAND



Photos: St. Clair; Visual Education Service

IRIS

flowers, resembling some of the lilies, have a peculiar arrangement of the floral envelopes, with three sets of petal-like parts, each set having three divisions. The outer set curve outward; the inner segments are inward-arching, and three petal-like stigmas cover

Soon after his ordination, in 1861, he became prominent as a temperance advocate, traveling

the stamens. The colors range from white and yellow to mauve and purple, appearing in many beautiful combinations, and suggesting the origin of the name, which is from the Greek for *rainbow*. Some of the German species, which have long been cultivated, show glorious yellows, bronzes, and reds. Irises range in size from dwarf plants to those four and one-half feet tall. Orris root (which see) is secured from European species. Iris-growing has become an important specialty, and in the United States an active Iris Society promotes this work.

Longfellow says of the iris:

Born in the purple, born to joy and pleasure,
Thou dost not toil nor spin,
But makest glad and radiant with thy presence
The meadow and the lin.

Fleur-de-Lis is a name sometimes used for irises. It means *flower of the lily*, and is supposed to represent a conventionalized form of white iris, which became



FLEUR-DE-LIS
Conventionalized
design.



FLEURS-DE-LIS

the emblem of the kings of France in the twelfth century. Charles V definitely adopted three golden fleurs-de-lis on a blue field as the design for the French coat-of-arms. B.M.D.

Scientific Names. Irises belong to *Iridaceae*, or iris family. The species include the yellow iris, *Iris pseudacorus*; Spanish iris, *I. xiphium*; English iris, *I. xiphoides*; dwarf bearded iris, *I. pumila*; and blue

flag, *I. versicolor*. The latter is a common wild species of the United States.

IRIS, in Greek mythology, the special golden-winged attendant and messenger of Hera (Juno of the Romans), the queen of heaven, whose commands she executed with tact, intelligence, and swiftness. Iris is usually represented seated behind the chariot of Hera, robed in an airy fabric of variegated hues resembling mother-of-pearl. The rainbow was originally regarded as the path over which she passed to earth, and thus Iris came to be the personification of the rainbow.

IRIS. See EYE.

IRISH FREE STATE. See IRELAND.

IRISH LACE. See LACE.

IRISH LAND LEAGUE. See DAVITT, MICHAEL.

IRISH LITERATURE. This term has two meanings. It may refer to productions in the old Irish, or Gaelic, tongue, or to those written in English by Irish authors. The latter is of far more general interest, but the former is well worth brief comment.

In Irish. Some very old inscriptions are still in existence which date presumably from the fifth century, but the oldest manuscripts are probably from the seventh century. One of these manuscripts contains in metrical form a life of Saint Patrick, which, however, is so interwoven with legends of miraculous happenings as to be of little authority. In the next age—the age after the Danes had been overthrown—poetry flourished [see IRELAND (History: The Coming of Invaders)]. These early Celts, barbarous as were some of their ways, produced excellent architecture, their manuscript books were exquisitely illuminated, and in even the common articles of household use, they showed a keen sense of the graceful and artistic. They were lovers of music, and a poet with his harp was almost as powerful as a king. The ballads or epics of heroes sung by these bards show considerable poetic skill and are the finest specimens of native Irish literature. Some of these are partly in prose, and even here there are manifested a remarkable vividness of description and the charm of unrestrained fancy.

Later Irish literature is of less significance. As the English language became more common and the Irish-speaking part of the population became smaller and lost its interest in education, fewer and fewer works were produced. Prose, indeed, practically ceased after the seventeenth century, but the musical old tongue continued to be used for poetry well into the nineteenth century, and played a real part in keeping alive a feeling of nationality. At last poetry, too, died out, and it seemed as though the language might fall into total disuse. In the early twentieth century, however, a Gaelic League was formed with the

object of reviving the use of Irish, and within a very short time it had almost a thousand branches. It has brought about the study of Irish in the schools, and it publishes numerous books and magazines.

In English. Not until the late eighteenth and early nineteenth centuries did there exist such a thing as an Irish literature in English. It began, as the old Irish literature had begun, with ballads, and one of these, *The Wearin' o' the Green*, has become widely known. The first stanza of this poem, dear to Irishmen everywhere, runs as follows:

O Paddy dear, and did you hear the news that's goin' round?

The shamrock is forbid by law to grow on Irish ground;

St. Patrick's day no more we'll keep; his colors can't be seen:

For there's a bloody law agin' the wearin' o' the green.

I met with Napper Tandy, and he took me by the hand,

And he said, "How's poor old Ireland, and how does she stand?"

She's the most distressful country that ever yet was seen;

They are hangin' men and women for the wearin' o' the green.

Thomas Moore is the most distinguished poet of this early period, and his *Irish Melodies* did much to awaken literary interest. Particularly well known is the little poem here given, referring to the harp, the national emblem of Ireland:

No more to chiefs and ladies bright

The harp of Tara swells:

The chord alone, that breaks at night,

Its tale of ruin tells.

Thus Freedom now so seldom wakes,

The only throb she gives

Is when some heart indignant breaks,

To show that still she lives.

Irish poets have always possessed the peculiar Irish qualities of imagination and fire, and much of their verse has had as its distinct object the awakening of national passion and the expression of patriotism. The first Irish prose-writer of note was Maria Edgeworth (1767-1849), and she was followed by Samuel Lover and Charles Lever, with their typically Irish tales—both novelists of whom any literature might well be proud.

For a time literary effort ceased, and Ireland seemed to have lost the creative spirit, but late in the nineteenth century there came into notice a movement known as the Irish Literary Revival, which brought to the fore a number of writers of acknowledged power. Perhaps the chief of these was William Butler Yeats, whose plays and poems breathe the very spirit of Irish romance. Dramatic literature was one of the branches which profited most

by this revival, and some of the plays of Lady Gregory, Yeats, and John Millington Synge, as set forth by the Irish Players, attracted the attention of the entire theater-going world. Of the poetry of Ireland in this late era, with its simplicity, its beauty, and its love for Irish soil, the *Lake Isle of Innisfree*, by Yeats, will give an idea:

I will arise and go now, and go to Innisfree.

And a small cabin build there, of clay and wattles made;

Nine bean rows will I have there, a hive for the honey-bee,

And live alone in the bee-loud glade.

And I shall have some peace there, for peace comes dropping slow,

Dropping from the veils of morning to where the cricket sings;

There midnight's all a glimmer, and noon a purple glow,

And evening full of the linnet's wings.

I will arise and go now, for always night and day

I hear lake water lapping with low sounds by the shore;

While I stand on the roadway, or on the pavements gray,

I hear it in the deep heart's core.

This brief sketch does not include the names of all the distinguished Irish writers. There have been, for instance, Swift, Goldsmith, Lecky, Oscar Wilde, and G. Bernard Shaw; but they are not in their writings typically Irish. Practically everything they wrote might have been just the same had they been born on the other side of the Irish Sea, but in the works of the authors discussed above nationality has been a dominating factor.

Related Subjects. The reader is referred in these volumes to the following articles:

Lever, Charles James
Moore, Thomas

Synge, John M.
Yeats, William B.

IRISH MOSS, OR CARRAGHEEN, *kair' a-geen*, names applied to several species of sea-



IRISH MOSS

weed which abound in the rocky districts of Great Britain and Ireland, and on the east coast of North America. The Irish moss of commerce has a thick, forked, somewhat fan-shaped frond, of reddish-brown or purplish

color. It is gathered from the rocks, and is washed, sun-bleached, and dried. Irish moss is nutritious and may replace animal jelly as the basis of soups and desserts; it is used by painters as the foundation of size. It is also of value in the treatment of lung troubles, when prepared medicinally in connection with other drugs. G.M.S.

Scientific Name. These plants belong to the family *Gigartinaeae*. The carrageen of commerce is *Chondrus crispus*.

IRISH SEA, a small sea which separates Ireland from England and Scotland. From Saint George's Channel, at the south, to the North Channel, both opening into the Atlantic Ocean, the distance is about 130 miles. The greatest width of the sea is 140 miles. The east half is shallow, but in Saint Patrick's, or North Channel, it has a depth of 850 feet. In the north-central part is the Isle of Man, and in the southeast the island of Anglesey. See MAN, ISLE OF.

IRITIS, *i ri' tis*. See BLINDNESS (Common Eye Diseases).

IRKUTSK, *ir kootsk'*. See SIBERIA (People and Cities).

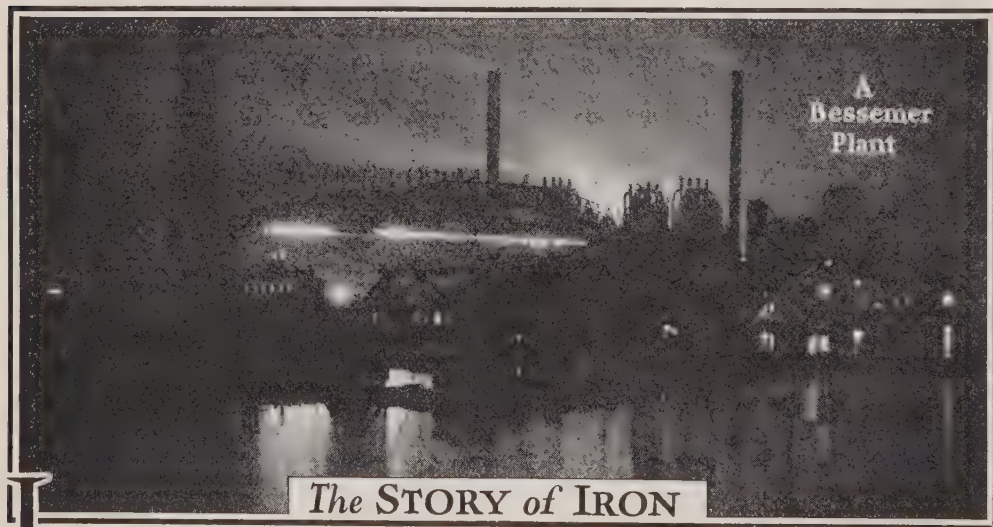
IRON AGE, the last of the prehistoric ages, following the ages of bronze and stone. It

was the period in the development of civilization when iron began to be used for tools and weapons. Before the Iron Age, all tools were made of copper, bronze, and chipped or polished stone; but the ancient peoples somehow discovered that iron was harder than bronze, that it would take a sharper edge, and was much easier to work. Also, as the first iron seems to have been beaten or hammered into shape, most implements of the Iron Age are of *wrought* iron, as hand-hammered iron is called. Many of them were skilfully made and beautifully decorated; some, evidently of a later date, have symbols and letters upon them, indicating the beginning of writing.

The peoples of Southern Europe learned how to use iron long before those of the northern countries. The age of Aeneas, Achilles, Helen of Troy, and King Menelaus, portrayed by Homer in his *Iliad* and *Odyssey*, was the first of the Iron Age, but the people of the Norse lands knew little of iron previous to the time of Caesar, about fifty years before Christ, and centuries after Homer's time. C.W.

Related Subjects. The reader is referred in these volumes to the following articles:

Age	Bronze Age	Iron and Steel
Bronze	Human Period	Stone Age



The STORY of IRON

IRON AND STEEL. Iron is a metal which might well be called the keystone of modern industry and material civilization; if deprived of it, the world would be reduced almost to the state of our barbaric ancestors. We have only to look about us to realize its importance. Our homes are entirely or in part held together by iron nails and screws; our doors are hung on iron hinges and have iron latches and steel locks, and we use iron stoves and iron cooking utensils. Our clothing, too, is partly iron, for

we have nails in our shoes. The trains and street cars and automobiles that take people to work, and the tracks upon which the first two run, are largely of steel (which is one form of iron), and our business buildings are built with steel frames or of concrete reinforced with steel. Wooden ships which carry the world's commerce, the "wooden walls" of the ancients, have almost entirely been superseded by those of steel, and navies, the policemen of the sea, are entirely of steel.

Industry is dependent on this exceedingly valuable metal, more than upon any other element in nature, for practically all machines and tools in factories or on farms, from tack hammers to giant cranes, are composed of it. Besides serving us in all these ways and countless others which sharp eyes will discover, iron, because of its magnetic properties, makes possible the telegraph, the telephone, and, indeed, radio. It is a part of our own bodies and is present in plants, giving to the first their red blood and to the second their green leaves. While this fact does not directly affect mankind, it is interesting to know that, by means of the spectroscope, iron is known to exist in many of the stars and in the photosphere of the sun.

The Age of Iron. Imagine how helpless we would be without saws and knives, and how awkwardly we would work if obliged to use hammers and hatchets of stone. The commencement of the Iron Age marked a great step in mankind's history. We do not know just when this was; of course it was at different dates in different parts of the world, and to some races it has not yet come. There is a piece of iron in the British Museum in London which is thought to have been made six thousand years ago. It is Egyptian, but probably the Assyrians were the first to become skilled workers in the metal. From them the neighboring nations learned of it, and we read of iron in the oldest books of the Bible. The ancient Britons appear to have discovered for themselves the art of smelting, but may have been taught it by the Phoenicians. It must have been by accident that iron became known, for it is very seldom found in the pure state, and to separate it from its ore requires intense heat.

Iron Ore. Iron is one of more than ninety chemical elements of which the material universe is composed. Its chemical symbol is *Fe*, derived from its Latin form, *ferrum*. It is found almost everywhere. It is present in a slight degree in all good soils, but as ore it is valuable only in great masses. Many deposits of iron ore which are at present untouched will become valuable when the price of the metal rises, when new inventions make mining cheaper, or when improved transportation brings them into closer touch with the centers of manufacture.

The ore is usually hard rock, which must be blasted and mined underground, but in the great Mesaba Range of Minnesota, it is so soft and so near the surface that it is taken out with steam shovels running on railroad tracks. These shovels can load a fifty-ton car in three minutes. This accessibility makes the Mesaba the most valuable iron region in the world.

In its chemically pure state, iron is a silver-white metal, but as taken from the ground, the presence of other substances with which

it is combined gives it a slightly red, rusty color. In most of the ore there is found lime, magnesia, arsenic, silica, copper, titanium, sulphur, phosphorus, and carbon. In the blast furnace these elements are removed as far as possible. Sulphur and phosphorus are particularly objectionable substances. Sulphur renders iron brittle; phosphorus persists to the extent that it cannot be entirely eliminated in the blast furnace, and in making fine grades of steel, ore with low phosphorus content must be used. The various grades of steel are determined largely by the proportion of carbon retained in the finished product.

There are several varieties of iron ore, and these contain varying proportions of metallic iron:

Magnetite, with about 72.5 per cent iron, is iron-black in color, is of metallic luster, and occurs in crystals or in massive form (see **MAGNETITE**). It is strongly attracted by a magnet; if this attraction is sufficiently strong to produce polarity, it is called loadstone, or lodestone (see **MAGNET AND MAGNETISM**).

Hematite, which is known also as red hematite and specular iron ore, contains about 70 per cent iron. It received its name from its red color, and occurs in crystals, usually in massive form. When found powdered and mixed with earth, it is known as red ochre.

Limonite, also called brown hematite, has about 60 per cent metallic content, and is dark brown in color.

Brown ore consists largely of limonite, but there are also present hydrous iron oxides.

Siderite, also known as spathic ore and carbonate ore, contains only about 49 per cent of iron.

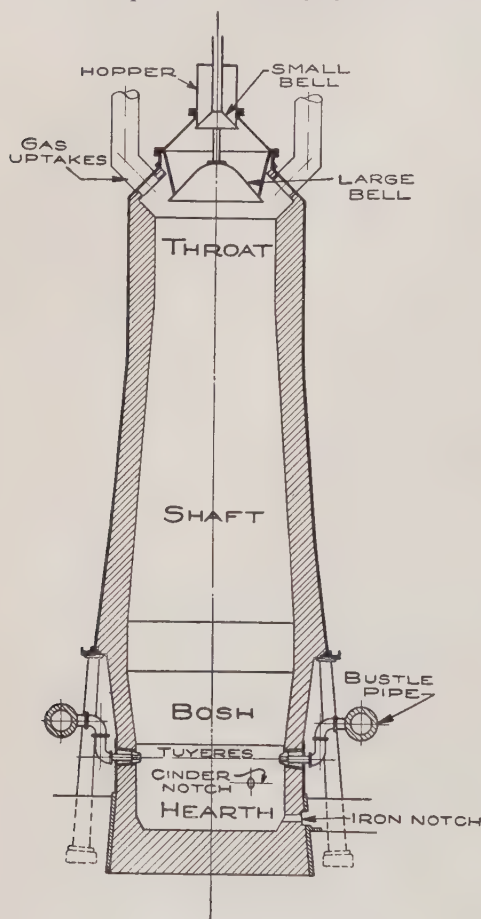
The Blast Furnace

When ore reaches the steel mills, the first process of iron manufacture is to remove impurities, a task which is accomplished through successive steps. It is first put through the blast furnace, the parts of which are shown and named in the accompanying illustrations.

The Modern Blast Furnace, the most important factor of all our manufacturing industries, is a most costly and spectacular machine. Few appreciate the fact that the value of our annual output of pig iron is greater than that of any other single manufactured product, and also greater than that of all other metals combined. It is the raw material of all forms of steel, and from it we make a most diverse line of articles, from skillets to skyscrapers, from bullets to battleships.

The function of the blast furnace is to remove the oxygen from the iron and to slag-off its impurities. Iron ore is the raw material, and is an oxide of iron, usually contaminated by various impurities. The usual deoxidizing, or reducing, agent is carbon in the form of coke, and its combustion furnishes the heat necessary to melt the resulting iron and slag. Limestone is added as a flux, and renders the slag more easily fusible.

The operation of the blast furnace requires a tremendous amount of equipment, such as the machinery for unloading ore and limestone from boats or railroad cars, and bins for storage of the materials; the stack, or furnace proper, with its skip hoist for charging the furnace;



PARTS OF THE BLAST FURNACE

the cast house, with runners for removing the molten iron to the ladles; the mud gun, for plugging the tapping hole, or iron notch; the reamer, for opening the hole in taking the iron from the hearth or crucible; hot-blast stoves, for pre-heating the air, boilers and turbines; washers, to remove the dust particles from the gas; and the pig machine, for casting the molten iron in the form of pigs.

The unloading of the materials for the operation of the blast furnace is accomplished by a large bridge crane, known as the ore bridge. These materials include several types of ore, limestone, and coke from by-products coke ovens, and these are stored in bins as near as possible to the furnace. The bins are labeled

with the name of the material they hold. Usually, the coke plant is also placed close to the blast furnace, so as to facilitate the handling of this commodity. Coke is usually loaded into the gondola type of car and placed immediately above the bins by the use of elevated tracks, and is unloaded by dropping the car bottoms.

According to the type of iron desired, the burden, or charge, for the furnace is calculated; then the coke, limestone, and the various kinds of ore are taken from the bins in accordance with the calculated burden. These materials are dumped into the scale car, whose bed sets upon a scale, and every pound of material is accounted for. The scale car then deposits these materials into the skip bucket, which carries the charge to the top of the furnace and deposits it in the small hopper. The bell of this hopper is then lowered, discharging the material into the large hopper below. Usually, six charges are passed from the small hopper into the large one before the bell of the large hopper is dropped, allowing the charge to pass into the furnace. All modern furnaces are built of the double-bell hopper type, and are constructed in this manner for saving of the gases; in no instance are both bells open at the same time. This prevents the loss of valuable gases which, as we shall see later, are necessary to the furnace operation.

The furnace proper is from 90 to 100 feet in height. The charge passes very slowly from the top of the furnace to the hot lower section, and comes in contact with the carbon-monoxide gases produced by the burning coke. The carbon monoxide robs the iron ore of its oxygen, thus reducing the iron oxide to iron, the oxygen contained in the ore passing out of the furnace with the gas. The iron which has been reduced is melted, owing to the high temperature, which is from 2,800° to 3,000° F., and passes to the lowest portion of the furnace, called the crucible, or hearth.

The limestone serves the purpose of making an easily flowing slag, which rests at all times above the iron in the crucible. The iron is taken out periodically to ladles on railway trucks, and is then taken to the pig machine, for casting into pig iron, or is transported to the open hearth for use as hot metal in making open-hearth steel, or to the Bessemer converter for immediate conversion into Bessemer steel. The slag, or cinder, is taken off at a higher point in the furnace called the cinder notch, or cinder monkey, eight or ten times each day. It is run through a trough into cinder ladles and used for filling purposes, or run into a tank of water, and after removal may be used for filling or in the manufacture of portland cement.

The air necessary for the combustion of coke is forced into the furnace by powerful blowing machines, at a pressure of eight to

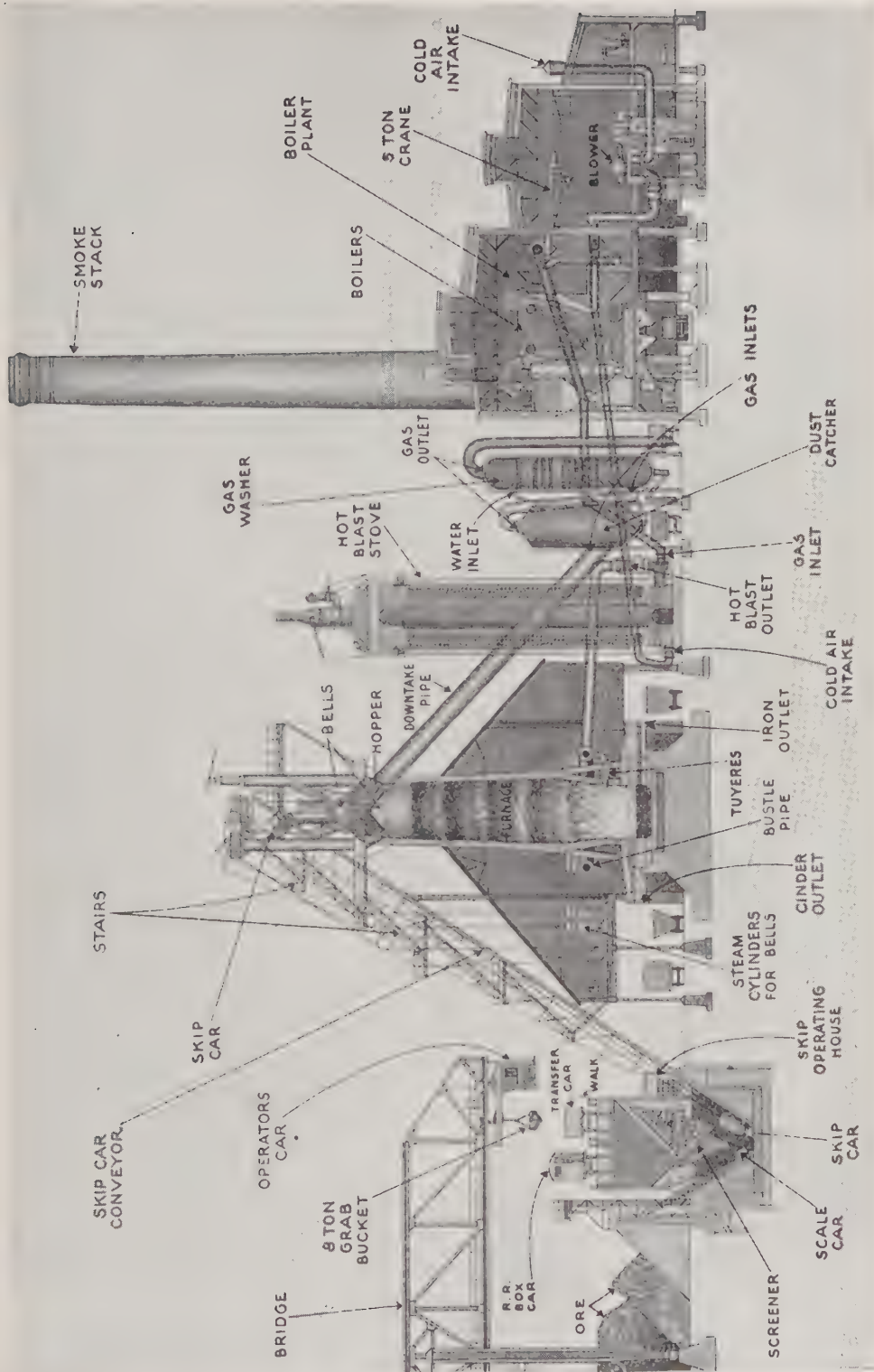


Diagram of a Modern Blast Furnace. Full explanation of its operation is contained in the accompanying text.

sixteen pounds per square inch. This air is first forced through the hot-blast stoves, and on entering the furnace has a temperature of about 1,200° F. The hot blast is advantageous in giving high furnace temperature, which not only effects a saving in coke per ton of iron produced, but also increases production.

The result of this combustion is a gas which has a fuel value of about one-fifth that of city gas. It is drawn off from the top of the furnace,

It will be readily seen, therefore, that the blast furnace is what is sometimes termed self-contained. Present-day blast furnaces yield from 600 to 800 tons of pig iron each twenty-four hours.

Pig Iron. Formerly, in the process of manufacture, the iron as it came out of the blast furnace flowed through a trench of sand into little branch trenches, where it hardened in bars called pigs. In present-day foundries, the pigs are formed by machinery, the molten metal running into molds which are moved on a chain through cold water and dumped into waiting cars. Pigs are seldom more than ninety-five per cent iron, for they contain, in addition, carbon, manganese, phosphorus, sulphur, and silicon, in varying quantities.

[Each of these elements is described in its proper place elsewhere in this work, and some of their effects upon iron are told later in this article.]

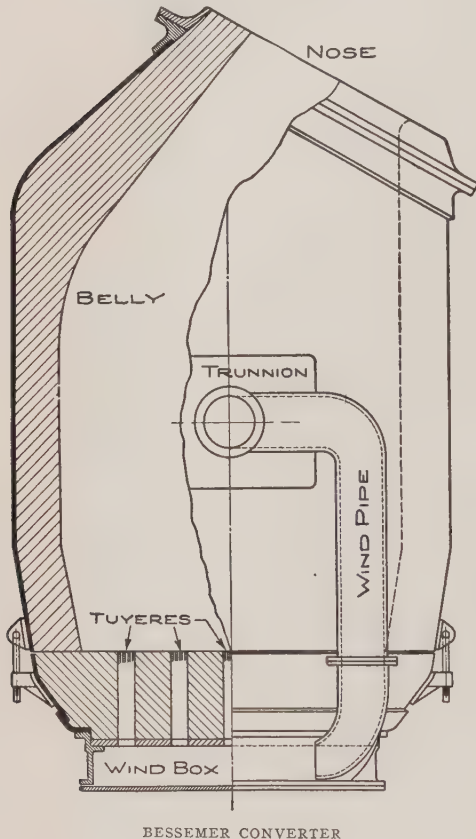
Pig iron might be called the raw material of the iron and steel industry. From it most of our steel and other forms of commercial iron are made. Where steel companies have their own blast furnaces, the pig iron is generally put into the converters for transformation into steel while still molten, to save the expense of reheating.

Cast Iron. The ornamental brackets on school desks and on stoves are examples of cast iron. They are made by remelting pig iron and pouring it into specially shaped molds. Cast iron is not malleable; that is, if you hammer it, you will break it. Its softness is due to carbon and silicon, its brittleness principally to phosphorus and sulphur. In 1915 an oil-burning *cupola*, or melting furnace, which produces iron with less sulphur, was adopted by leading manufacturers.

Wrought Iron. Iron which can be hammered into shape as a blacksmith hammers a horse-shoe is wrought iron. It contains very little carbon. The metal lump made in the ancient clay furnace was wrought iron, which requires less heat than cast iron.

Nowadays, it is much cheaper to make wrought iron from pig iron than directly from the ore. While the pigs are in the long horizontal furnace called a *puddling* furnace, the charge is stirred through a small door, with a sort of hoe. When most of the carbon and other impurities have been burned off, a pasty mass of iron results. This is broken into balls of 100 or 200 pounds and put through a squeezer, which crushes out most of the intermingling slag and welds the grains of iron together. The metal is then rolled into bars, cut in pieces, piled, heated, and rolled again several times. Wrought iron may also be made from scraps of cast iron and steel.

A piece of wrought iron can be welded to another piece without solder, an operation im-



and is passed through the dust-catcher and then into the gas-washer, which thoroughly cleans it. It is then burned under the boilers, creating steam. This in turn operates the blowers, which force the air into the furnace. This gas may also be used to reheat the hot-blast stoves.

There are usually four hot-blast stoves to each furnace; these are coupled in series, and after being properly heated, the gas is shut off and the air forced through from the blowers into the furnace. This operation lasts about an hour, when the temperature is considerably lowered in the stove; then the air is turned through another one, and the first one is allowed to reheat.

possible with any other metal except steel or platinum. Its principal value is for bars, bolts, and plates, but here is found a wide field of usefulness.

The Manufacture of Steel

Before the development of steel took place, iron castings were used for almost every metal need. To-day, steel has almost entirely superseded iron castings. By the makers, metallurgists, and chemists, it is generally defined as being an alloy of iron and carbon.

Its uses have developed to cover such an increasingly wide field that its manufacture has become our major industry. Perhaps the best example of this statement is in our present-day motor car, which, aside from the wood of the spokes and framework, the upholstery, and a few hardware fittings of brass or bronze, is composed entirely of steel of various shapes and compositions, with the one possible exception of the engine block, which is made of cast iron.

Blister Steel. In times past, wrought iron was used to a great extent, and this material was made by working pig iron in a reverberatory furnace, better known as a puddling furnace. The man at this furnace heated and worked the iron until the impurities were almost totally removed and the iron was worked up into a ball. This ball, containing large amounts of slag, was taken from the furnace and the slag squeezed or hammered from it. It was then forged or rolled into the shape of bars. In many cases, these wrought-iron bars were piled together, reheated, and rolled or hammered into shapes according to the use for which they were intended. It was discovered that by placing bars of wrought iron in a furnace, covering them with wood charcoal, closing the furnace tight, and bringing the heat up gradually, then allowing the bars to soak at a high temperature for a period of from seven to twelve days and slowly cooling, the manufacturers were able to obtain steel which was not of uniform composition. In other words, the carbon had combined with the iron, but was not distributed evenly throughout the steel. This type of steel was called "blister steel" on account of the blisters formed by the action of the slag contained in part of the carbon, which caused carbon-monoxide gas to form under the surface.

Crucible Process. The famous steels of Damascus and Toledo were made by a crude form of the crucible process, but this process was lost during the Middle Ages, and was rediscovered in 1742 by Benjamin Dustman, an English watchmaker who had used blister steel for making watch springs and had found it unfit on account of its lack of homogeneity. He, however, discovered that, by breaking or

Slag, far from being useless waste, is an excellent material for ballasting railroad tracks, and makes a good basis for concrete, as is graphically shown in the article CONCRETE.

shearing the blister steel into small pieces and melting it in a clay crucible, he was able to obtain a steel which, when worked up into watch springs, served in a very satisfactory manner. Crucible steel from that time was very popular, until the advent of the Bessemer and open-hearth processes.

The present-day crucible furnace is built of brick, with the melting pot, or "the hole," placed between and above two pairs of checker chambers—one checker chamber on one side, used for pre-heating the gas used as fuel, and the other for pre-heating the air for supporting combustion. The air and gas travel through their respective checker chambers, being pre-heated and combining in a flame in the top, and the hot gases pass through the hole and around the crucibles and down the checker chambers on the opposite side, thus heating them. At regular intervals, the travel of the gas and air is reversed to the opposite side by a system of valves placed near the stack. This operation serves to use the heat in one set of checkers, and heats the other set for the incoming air and gas during the next period.

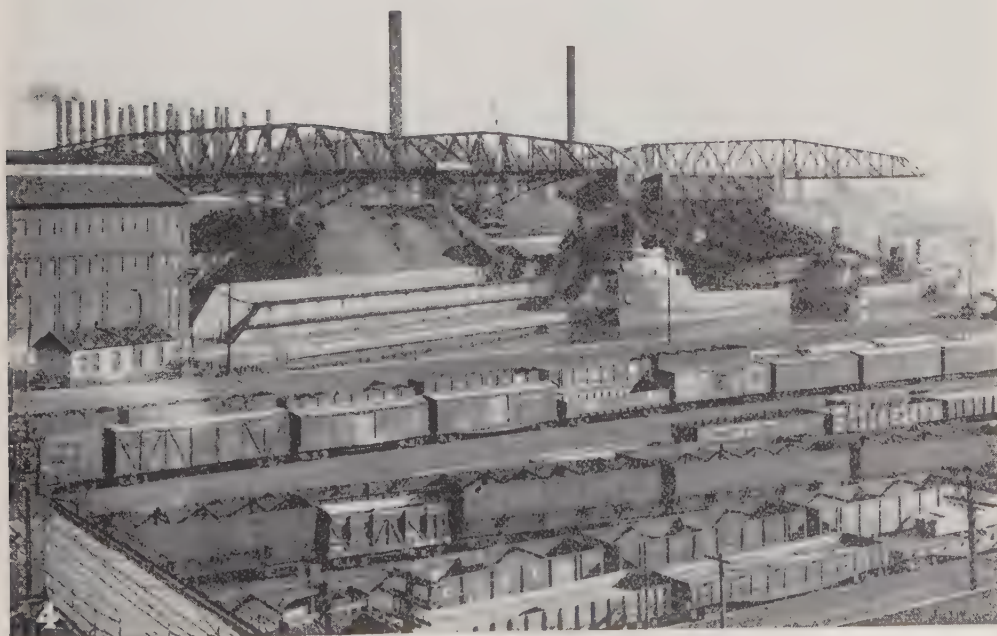
The crucibles are made of fifty per cent clay and fifty per cent graphite, and will hold a charge of about fifty pounds. Crucibles are charged with the material calculated to furnish steel according to the type desired. They are placed in the hole, and the heat is applied for a period of three hours, after which they are allowed to remain for about a half-hour period. This procedure, called "killing," is intended to allow all gases which may be in the steel a chance to escape. Afterward, the crucibles are lifted from the hole by a man who is entirely swathed with wet bandages, and the steel is poured into molds. After cooling, the wedges of the molds are removed and the molds taken from the ingots. The steel is then ready for rolling or forging, as the case may be.

At the present time, the crucible process is used mainly for making high-carbon and alloy steels.

Electric Furnace. To-day, the crucible process is rapidly being superseded by the electric furnace, which permits larger amounts of good, homogeneous steel to be made at a lower cost. In America, the Heroult furnace is the most popular, because of its ease of handling. The furnace is round, and the shell is made entirely of heavy plate. The interior is lined throughout with three courses of brick, the course next to the shell being of fire brick,



Beginning the Story of Iron and Steel. (1) Open pit ore-mining with a steam shovel. (2) Loading ore vessels at docks.



Bringing Ore to the Steel Mills. (3) Vessel filled with 10,000 tons of ore, anchored by the side of unloading machinery. (4) Train yard, ore dock, unloaders, and ore yard.



EXTERIOR VIEW OF TYPICAL BLAST FURNACE, CAST HOUSE, AND STOVES

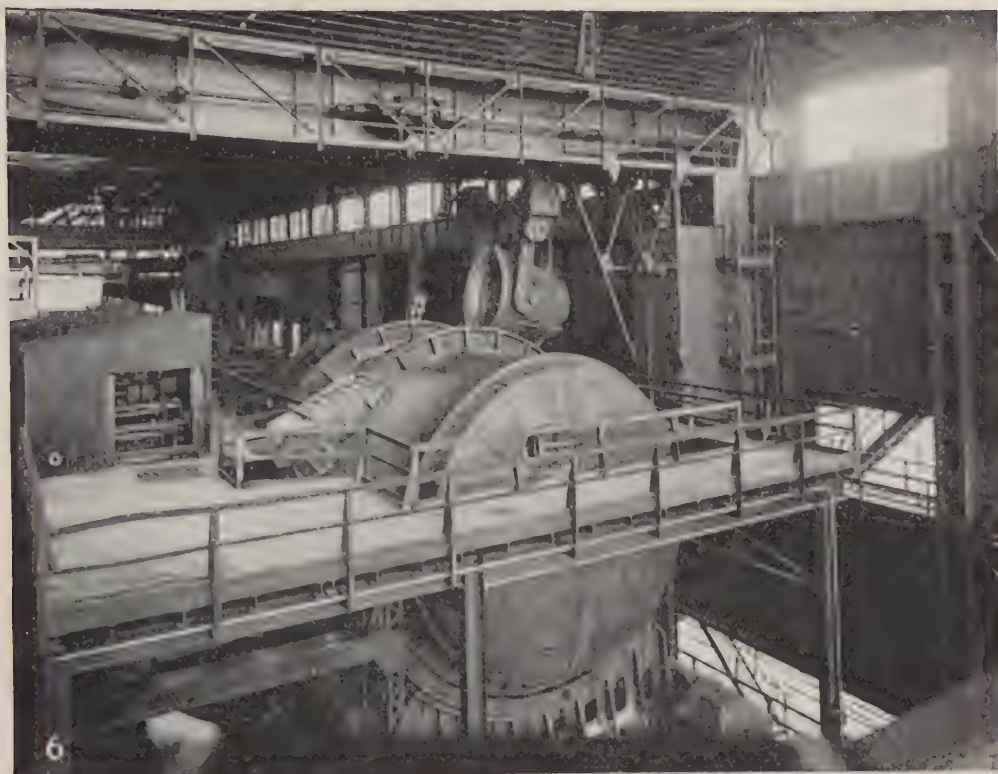
and the two remaining courses of magnesite brick. The bottom is built of double-burned magnesite, which is an excellent refractory for the high heat of the electric furnace. The furnace is supported by two rockers, which have teeth that mesh into teeth on their supports. This arrangement enables the operator to roll the furnace at the time of tapping, and makes unnecessary the placing of a tight plug in the taphole. Carbon electrodes extend through the top of the furnace to the steel, and the extremely high heat is obtained by

having the electric arc extend from one electrode to the other.

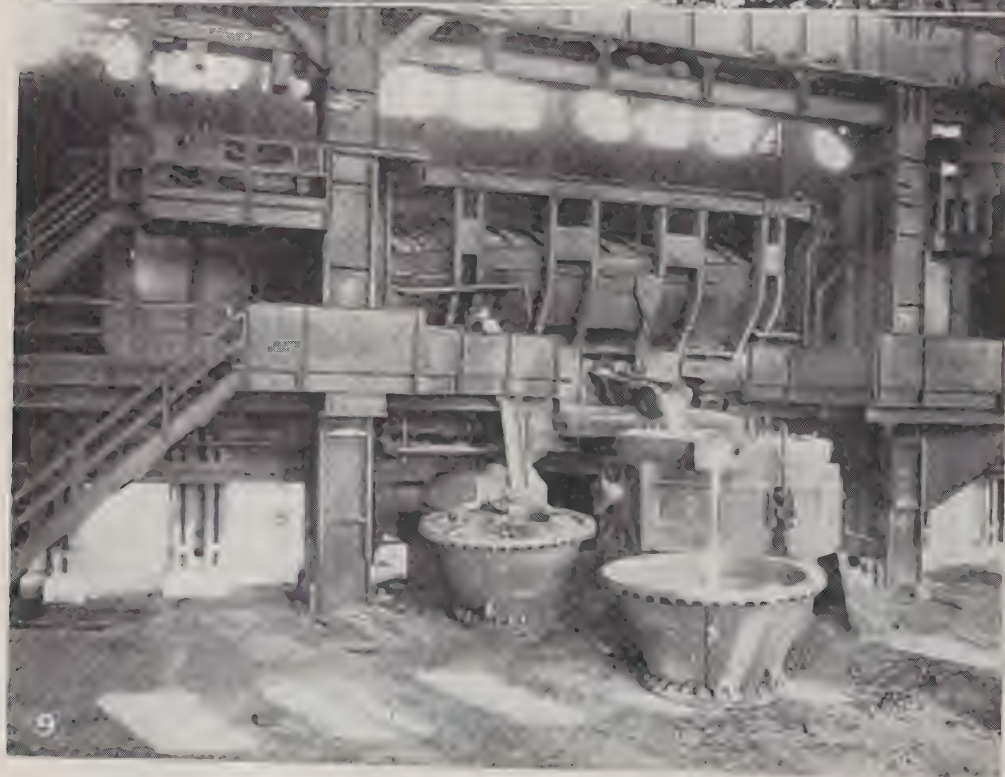
By varying the composition of the charge and the slags, the operator is able to obtain the best quality of steel of almost any composition.

Bessemer Steel. We will now take the reader to the Bessemer department. This department is equipped with cupolas for melting cold pig iron for making Bessemer steel. These are at the present time very little used, for the reason

(Continued on page 3546.)



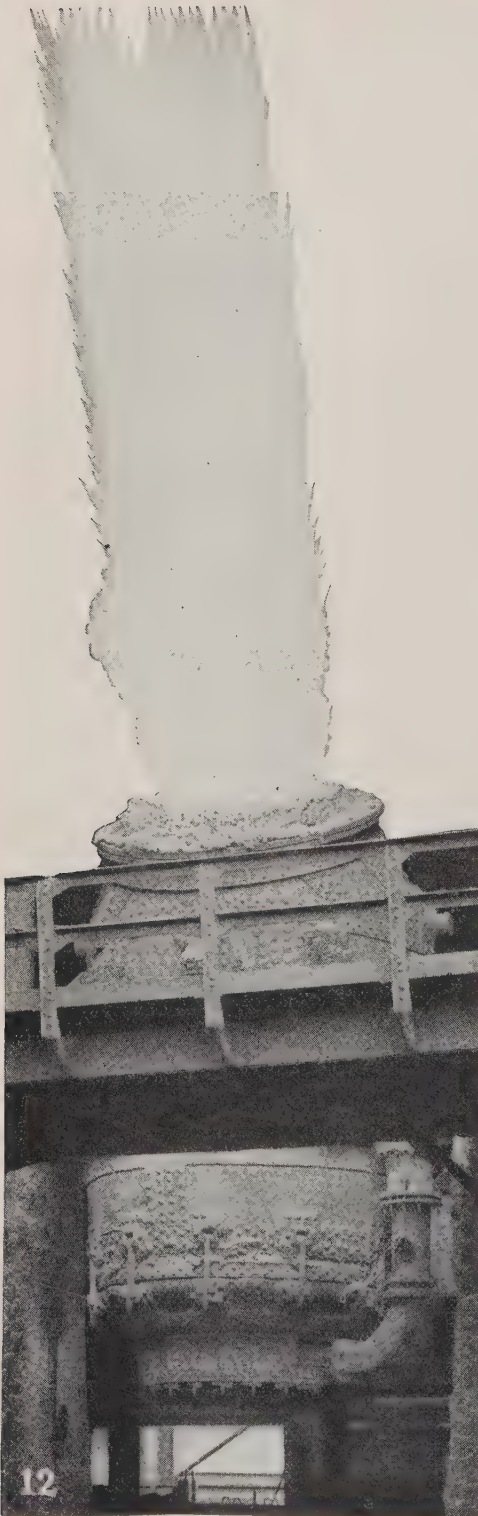
Making Pig Iron. (6) Mixer, or reservoir, for storing molten pig iron; capacity, 1,300 tons. (7) Another view of the mixer.



Open-Hearth Process. (8) Charging floor of an open-hearth furnace. (9) Tapping an open-hearth furnace.



Charging and Pouring. (10) Charging hot metal at 25-ton Heroult electric furnace. (11) Basket-pouring at electric furnace, showing refractory top molds.



that most of the iron used comes from the blast furnace and is placed in a 600-ton mixer. This mixer is placed about ten feet above the floor and is oval in shape, having an opening in the rear for pouring in the hot metal, and a larger opening, with a spout, in the front end, for pouring the hot metal into the charging ladle. This department has two converters, which are round, but longer than their diameters, from top to bottom. On the top is what is termed "the nose" or opening, and it is placed eccentric to the center line of the converter. On the bottom are wedged the tuyeres, or openings through which the wind or air is allowed to pass through the iron. Beneath the tuyeres is a round steel plate box, the "wind box." The converter, or vessel, is set on the two supports and is so arranged that it may be turned in a circle by the aid of a motor. The vessel is lined with a siliceous material called *mica schist*. At a point equidistant from the converters and the pouring platform is placed a hydraulically operated ladle crane. This crane has two arms, upon which the ladle rests, and is capable of swinging the ladle under the nose of either vessel when tapping, and can swing the ladle to the pouring platform for pouring the steel into the molds. The compressed air is furnished by pumps and delivered to the vessel through pipes flexibly coupled at the top of the supports.

On receiving molten iron from the blast furnace, the ladles are picked up one at a time by a huge crane, raised to the charging hole of the mixer, and poured into the mixer. The iron for blowing is then taken from the other end of the mixer into a charging ladle, and when the proper amount of iron is secured in this ladle, it is moved to a converter by a cable. The converter is turned in a horizontal position and an iron runner is swung into the nose. The iron from the ladle is then poured into the converter by the aid of the runner, and upon receiving sufficient metal for the blow, the runner is turned back and the compressed air turned into the converter through the tuyeres. The converter is then raised to almost a vertical position, and the air allowed to blow through it for a period of from ten to fifteen minutes, at a pressure of about twenty pounds per square inch.

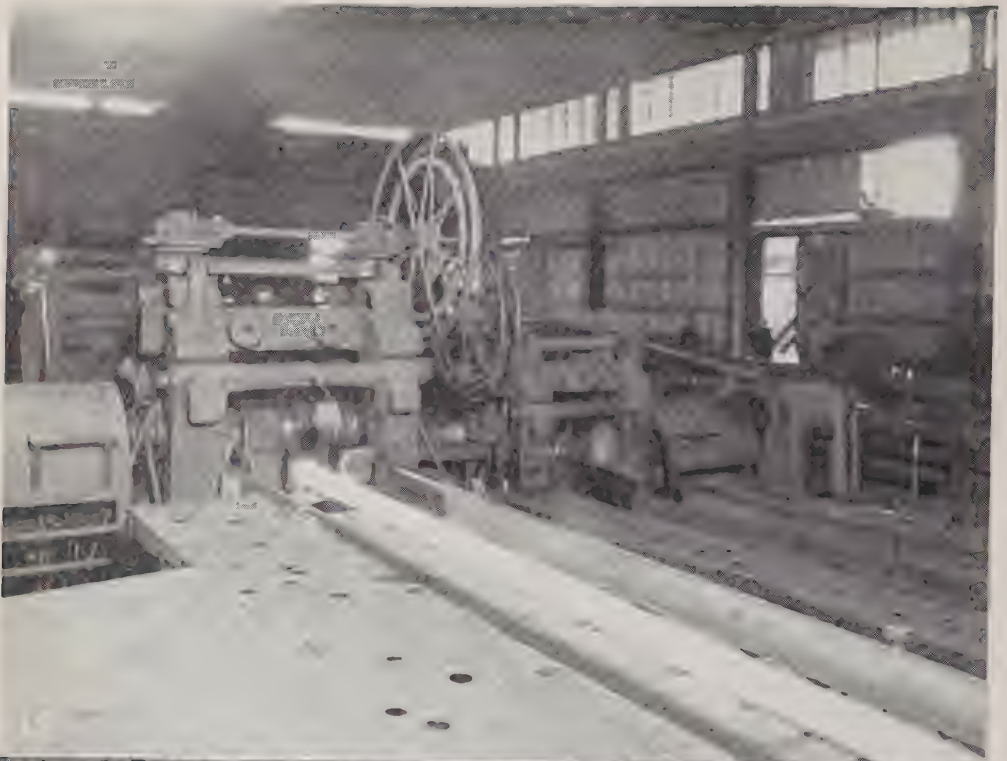
At first we notice a short, snappy flame, which is caused by the burning or oxidation of silicon, and as the carbon and manganese begin to oxidize, the flame increases in length and is streaked with yellow. The oxidation of the silicon, manganese, and carbon causes an increase in heat, and this increase is taken care of by adding about one and one-half tons of cold scrap. The blow then proceeds until

BESSEMER CONVERTER IN ACTION

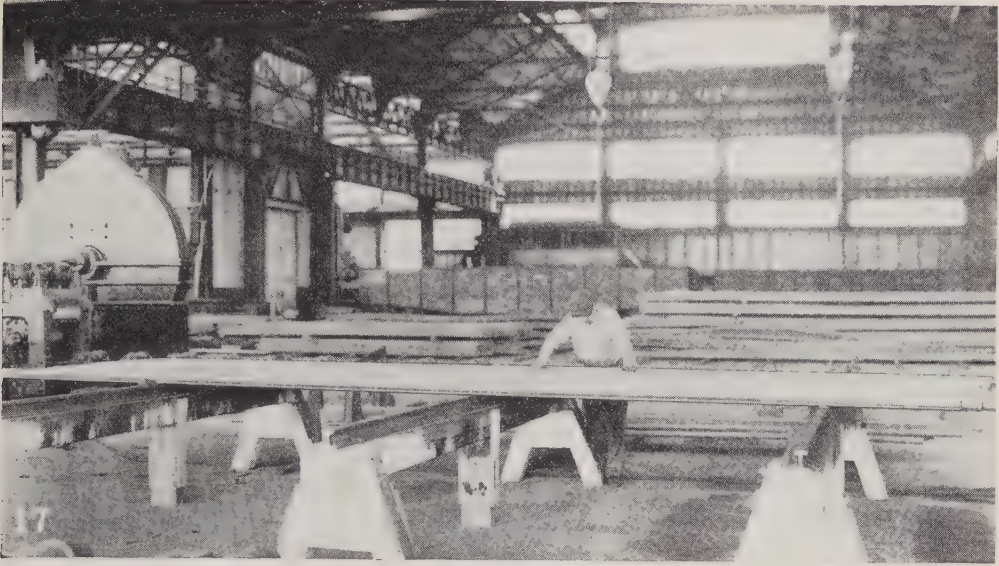
The flame, under pressure, shoots high into the air.



Nearing the Stage of Steel. (13) Stripping ingots. (14) Hydraulic shears and tables in slabbing mill.



Bars and Cooling Beds. (15) Bar in the rolls at the bar mill. (16) Cooling beds and shears at the bar mill.



INSPECTING BAR STEEL

the silicon, manganese, and carbon are almost completely oxidized, at which time the flame decreases in length; and should the heat be too great, the blower proceeds to cool the iron further by blowing steam through the converter with the air. When the blow is finished, the converter is turned down and the steel tapped into the ladle, and at this time, ferro-manganese is added to rid the steel of oxides which are always present in steel manufactured by such a process, and to give to the steel a manganese content of about 0.4 per cent. The ladle is then swung around over the molds and the steel poured into the molds and allowed to cool, after which the steel is taken to the stripper and the molds lifted off. The ingots remain on the buggies, and are then ready to be shipped to the soaking pits and reheated and rolled.

In some parts of Germany, where high-phosphorus iron ores are used in the blast furnace, the iron resulting from such ores contains a great amount of phosphorus. The Bessemer process used there is the basic Bessemer, or Thomas, process, and with the use of lime on a lining of magnesite, it is possible to rid the steel of a part of its sulphur and almost all the phosphorus, as well as carbon, manganese, and silicon. The process used in America is of the acid type, and in such a process no sulphur or phosphorus can be removed from the iron.

Open-Hearth Steel. Let us leave the Bessemer now and go to the open-hearth department. Here we find extremely large furnaces for the manufacture of steel, constructed somewhat on the order of the crucible furnace,

with checker chambers beneath. These are placed on each side in a horizontal position, with the furnace above and between them, although, instead of holding a few crucibles, the furnace is capable of holding many tons of molten steel in its hearth. The furnaces vary in size and range from about 15 to 350 tons, and are rectangular in shape. The fuel and the air meet at the end and pass into the furnace through ports over the charge and out at the opposite end, the hot gases acting on the checkers in the same manner as in the crucible furnace; the flow of gas and air is also changed periodically—about every twenty minutes. This type of furnace is built mainly of silica brick, and is held together by large steel columns and buck stays. A large pan made of riveted steel plate is placed at the bottom, and upon this is built a thick covering of magnesite brick, on top of which a thick layer of double-burned magnesite is fired. On one side of the furnace are doors for charging, and on the opposite side is the taphole for removing the molten steel when the heat has been properly "shaped up." The side containing the doors is called the "charging side," or "floor side," and the opposite side is called "the pit," or "tapping side."

In charging such a furnace, limestone, pig iron, and scrap are brought in on the floor side in charging boxes on buggies, and placed in front of the furnace. A large charging crane then picks up the box and inserts it into the furnace, turns it over, and dumps the charge upon the bottom of the furnace. The limestone is charged first, the pig iron second, and the scrap on top; but in cases where hot metal or

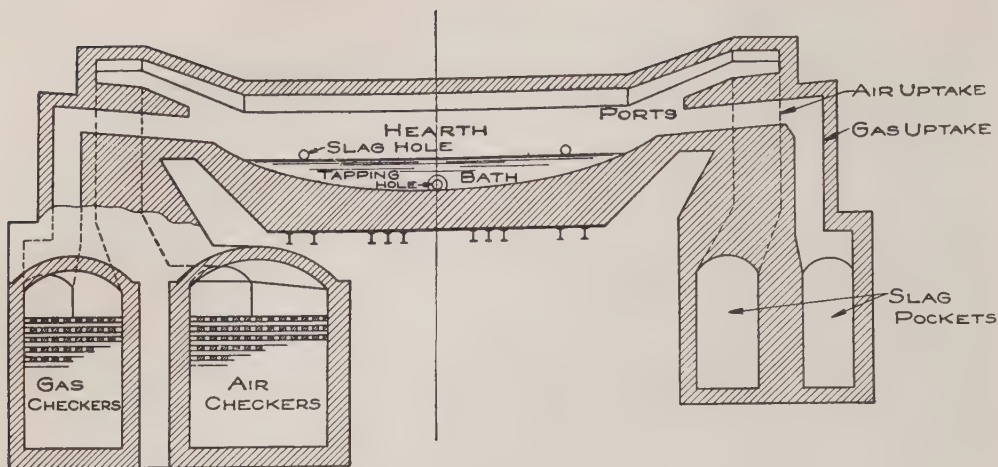


DIAGRAM OF OPEN-HEARTH FURNACE

molten pig iron is used and stored in the mixer, the limestone is charged first, the scrap second, and this charge melted down before the addi-

tion of the charge is gradually brought to a molten condition; then the lime which was charged on the bottom begins to work through the steel and forms a calcium-silicate slag on top, and at the same time removes a portion of the sulphur and almost all the phosphorus in the charge.

The high heat is applied until, in the opinion of the man in charge of the furnace, called the melter, it is ready for tapping, at which time the ladle is placed under the spout and the taphole opened, allowing the steel to run into the ladle. The ladle is equipped with a small spout which allows the larger portion of the slag, which leaves the furnace during the latter part of the tap and flows into the ladle, to skim off into a thimble placed beside it. As in the Bessemer process, ferro-manganese is added as a deoxidizer, and also to include in the steel a small amount of manganese, according to the type of steel desired. The ladle then is picked up by a huge ladle crane of about 200 tons capacity, and taken to the pouring platform, where the molten steel is poured into the molds similar to the Bessemer. After cooling, the molds are stripped from the ingots and the ingots sent on the buggies to the soaking pits for reheating and rolling.

Acid Open-Hearth Process. The furnace for the acid open-hearth process is constructed in the same manner as that for making basic open-hearth steel, with the exception that the bottom, instead of being built of magnesite brick and fired magnesite, is built of silica brick and silica sand, fired, or sintered, to make the bottom. These furnaces are generally smaller than those used in the basic process, and are at the present time used in foundries where steel castings are made. The furnace is charged in the same manner as the basic furnace, except that the basic material, lime-

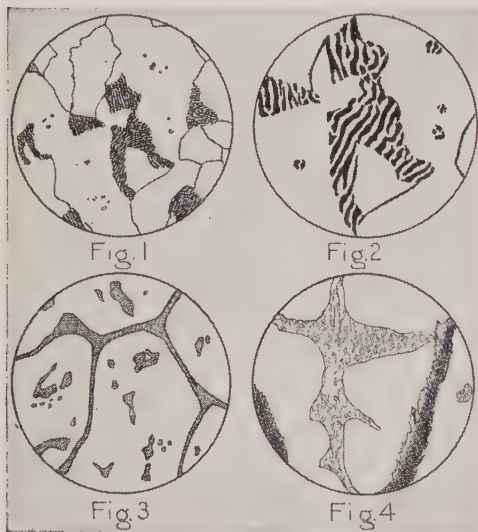
IRON AND STEEL SEEN THROUGH THE
MAGNIFYING GLASS

Fig. 1. Soft, or low-carbon, steel. The light spaces are iron; the dark, combined iron and carbon, called *pearlite*. Fig. 2. Pearlite, which resembles mother-of-pearl, is formed of alternate plates of iron and carbide less than $\frac{1}{25,000}$ of an inch thick. Fig. 3. Steel with too much sulphur. The lines and spots between the grains of iron are iron sulphide, which melts more easily than iron and makes the steel brittle when heated. Fig. 4. Cast iron. Breaks are liable to occur along the black lines, which are plates of graphite. The mottled areas are iron and phosphorus and carbon; the white are iron crystals.

tion of the hot metal. It will be seen here that hot metal saves time and reduces the cost of open-hearth steel. After charging the furnace,

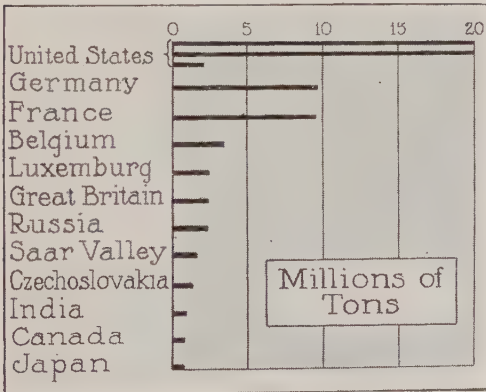


GREAT LAKES ORE BOAT

This type of vessel is built 550 to 600 feet in length. It will carry 10,000 tons of ore.

stone, is entirely left out, the pig iron being placed upon the bottom and scrap charged on top of the pig iron. Inasmuch as it is impossible in this process to eliminate sulphur and phosphorus, as is the case in the basic furnace, it is necessary to use the very best scrap and pig iron to make good steel.

The removal of impurities is similar to the operation of the Bessemer process described above, inasmuch as silicon, carbon, and manganese are the impurities removed. The heats are worked somewhat as in the basic open-hearth furnace, but the slag is highly siliceous, containing some manganese and iron oxides.



PIG IRON PRODUCTION

The number of millions of tons for each country represents averages for three years.

Heats are tapped and poured into molds, allowed to cool, and are then stripped, ready for reheating and rolling. H.M.M'C.

IRON CHANCELLOR. See BISMARCK-SCHÖNHAUSEN.

IRON CROSS, a German military decoration awarded to officers and men of the army

and navy for acts of bravery or for distinguished service in war. This decoration was instituted by King Frederick William III of Prussia in March, 1813, at the time of the struggle of Germany against Napoleon. At that time it was given only to Prussians, but when it was revived during the Franco-German War, in 1870, it was awarded to any German soldier who deserved to receive it.

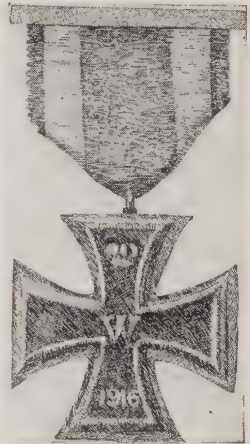
In simplicity of design, small intrinsic value, and the honor and reward bestowed upon the recipient, this decoration reminds one of the rarely bestowed English decoration, the Victoria Cross. A noticeable fact during the World War was

the very large number of German soldiers who received the Iron Cross, as compared with the small number of British soldiers who received the Victoria Cross; the latter decoration thus became more valued. It was estimated that, for each recipient of the Victoria Cross, there were at least three thousand recipients of the Iron Cross. See VICTORIA CROSS.

IRON CROWN OF LOMBARDY. See ITALY (History: The Middle Ages); CROWN, subhead.

IRON GATE. See DANUBE RIVER.

IRON MASK, THE MAN IN THE, a mysterious French character confined in the



AN IRON CROSS

The design that was presented for German valor in 1916 and in the succeeding years of the World War.

Bastille and other prisons during the reign of Louis XIV. His face was always concealed by a mask of black velvet, and his name and story were rigidly guarded. All that is known about him is that his speech was pleasing and his bearing that of a gentleman. When he died, his mask and other personal possessions were burned, the walls of his cell were scraped and whitewashed, his floor was retiled to destroy any possible traces of his identity, and he became a character of mystery. Over seventy books about him have been published, including Alexander Dumas' romance, *The Man of the Iron Mask*. Half a dozen theories have been suggested to explain his identity, but the one most generally accepted makes him a subject of the Duke of Mantua in Italy, Count Matthioli by name. Because of treachery and double dealing, he incurred the displeasure of Louis XIV, who punished him by sentencing him to a living death.

IRON MOUNTAIN, a low peak of the Saint François Mountains in Southeastern Missouri, so called because of its great deposits of high-grade magnetic iron ore. The hill also contains porphyry, a hard, purplish stone which takes a high polish and is used for decorative purposes. The mountain rises 1,078 feet above sea level and is less than about 300 feet higher than the surrounding country. It is heavily wooded with oak trees.

IRON MOUNTAIN, MICH. See MICHIGAN (back of map).

IRONSIDES, a name applied to the army of Oliver Cromwell (which see).

IRONSIDES, OLD. See CONSTITUTION, THE.

IRONTON, OHIO. See OHIO (back of map).

IRONWOOD, OR **HORNBEAM**, popular names for certain trees having exceptionally hard wood. In North America two well-known species belonging to the birch family are included in this group. The *hop hornbeam*, or *ironwood*, is a small forest tree distributed throughout the United States east of the Rocky Mountains. The trees grow singly in the woods, never in groups, and may be recognized by their birch-like leaves, fruit clusters resembling hops, and furrowed, grayish bark. The slender trunks grow from twenty-five to fifty feet tall. The wood of the hop hornbeam is so hard that the trunks of the trees have been used by lumberjacks as levers. It is one of the best materials for tool handles and small implements.

The other species, called *American hornbeam*, *blue beech*, and *water beech*, is common in moist places in the states east of the Rocky Mountains. Its bark is smooth, except on some old trees, and is like that of the beech in texture, but is a decided blue-gray in color. The slender trunks are gnarled and swollen in ridges under the close-fitting bark. These trees seldom grow

taller than twenty feet. They have crooked, flexible branches that are sometimes woven together to make arbor walks in parks and gardens. The wood is difficult to tool, but once in shape will last indefinitely. G.M.S.

Scientific Names. These trees belong to the family *Betulaceae*. The hop hornbeam is *Ostrya virginiana*; the American hornbeam, *Carpinus caroliniana*.

IRONWOOD, MICH. See MICHIGAN (back of map).

IRONY, *i' ro nie*. This word, which comes from a Greek term meaning *to dissemble*, or *to say less than is meant*, is used to describe one of the most forceful figures of rhetoric. The writer or speaker who employs irony makes a statement, apparently in all seriousness, when in reality he wishes to convey just the opposite meaning. In his wonderful speech over Caesar's body, for instance, Antony refers several times to the "honorable men whose daggers have stabb'd Caesar," and thus by his ironical use of the word *honorable* stirs up his hearers to a frenzy. Defoe and Swift are two great masters of irony in English literature, but while the irony of the former is kindly, that of Swift has an almost insane bitterness.

The word *irony* is often used in connection with results which are opposite to, or apparently in mockery of, the expected results, as the "irony of fate."

IROQUOIAN, *ir' o kwoi an*, **INDIANS**. See INDIANS, AMERICAN (Families or Confederacies).

IRRAWADDY, OR **IRAWADI**, *ir ah wah'-die*, **RIVER**, the principal and most picturesque stream of Burma, flowing for over 1,500 miles through rocky mountain gorges and thickly populated agricultural districts, down into the the broad, flat rice fields on the delta, through which it enters the Bay of Bengal. It rises near Mount Daphabum, on the extreme north-east border. Small steamers ply regularly to Bhamo, which is over 1,000 miles from the mouth of the river. For 100 miles from the sea, extensive embankments have been built to protect property along the delta, for it is in great danger during the summer months, when the river rises. A railroad runs through its valley.

IRREDENTISM, a term referring to a political situation in Italy after 1878. Through wars, that country had lost territory in the extreme northern part of the country, and "Italia Irredenta" (unredeemed Italy) became a slogan of the nation. The area in question was owned principally by Austria, though Switzerland and France laid claim to some of it. Principally, Italy desired the return of the Tyrol and Trieste, though it also wanted Dalmatia, Ticino, Corsica, and Nice. After the World War, much of the territory of Tyrol and the city of Trieste were awarded to Italy.



IRRIGATION, *ir ih ga' shun*. Nearly everyone has had some experience with flower culture and knows how important it is that the plants should be watered at certain stages of their growth. Though other plants are less delicate, they are no less dependent on water, and if all that they require does not come to them in the form of rain or of moisture in the soil, it must be given to them by man. Irrigation, or artificial watering of vegetation, has been practiced in simple ways for thousands of years, but only within the last half century has scientific knowledge been applied to watering the waste places. Men knew that with the aid of water crops could grow in the desert, but they did not know how much water was needed for the best results, when to supply it, or how to handle it without waste.

While there are exceptions to this statement, land having an annual rainfall of less than ten inches is ordinarily unproductive without irrigation, and regions where the rainfall is between ten and twenty inches require dry-farming methods (see DRY FARMING).

How Lands are Irrigated. There are a number of methods of distributing the water over fields. In more than nine-tenths of the irrigation in the United States and Canada, water is brought to the fields through ditches. The main ditch or canal takes the water from the source of supply, and head ditches join the main ditch on each side at regular intervals. A gate prevents the water from entering the head ditch when it is not needed. At the time of irrigating, this gate is opened. The plan of

distributing the water over the field is determined by the crop. Fields on which alfalfa, wheat, or other crops of similar character are grown are usually flooded, which is done by placing a portable dam, usually made of canvas, across the ditch at intervals of about three rods. When the water has flooded one strip, the dam is moved on to another, the process being repeated until the field is irrigated.

Fruits, potatoes, corn, and other crops planted in rows are usually irrigated by running the water in furrows between the rows. Sprinkling and the use of underground pipes are other methods employed to some extent in gardens and on truck farms, both in arid and in humid regions.

Whatever the method used, the ground must be prepared for the proper flow of water before planting. A slope from ten to twenty feet to the mile will usually allow the water to flow

freely and without currents that may carry the surface soil along with them. Where the land slopes too rapidly, checking is necessary; that is, ridges are raised around the edges of small plots, which are made practically level. The same rule holds in irrigating by furrows. The grade must be slight or the current will cause damage.

Development in the United States. Long before the white man came to America, irrigation was carried on by the city-dwelling Indians of New Mexico and Arizona. In that region, and throughout most of Utah, Nevada, and Southern California, and parts of Colorado, Wyoming, Idaho, Washington, and Oregon, less



Photo: Visual Education Service

AN ORANGE GROVE

A scene in Salt River Valley in Arizona a few years after water was brought to the parched land.



Photo: U & U

WHERE MEN HAVE TOILED FOR FOUR THOUSAND YEARS

Here is shown the most popular kind of irrigation device used to the present day in old Mesopotamia, now the modern Iraq. The heavy framework is made of date-palm trunks, and the buckets are of oxhide. These Moslems are dark-skinned men with traces of Assyrian and Chaldean blood, and it may be conjectured that they are directly descended from people of the time of Abraham and Lot. They are very poor, very dirty, and ignorant of everything outside of their everyday experiences.

than ten inches of rain falls each year. This will sustain only such vegetation as the sagebrush and the cactus, which nature has adapted to arid regions. The Spaniards who came to America knew something of the irrigation systems which the Moors had established in Spain, and they taught the Indians to build masonry dams and reservoirs. The Mormons and other early settlers in the West found irrigation indispensable. When the pioneer gold-seekers were mining the California gold by washing it from the stream beds, many ditches were dug, some of which afterward proved even more valuable as irrigation ditches. But not until the last quarter of the nineteenth century were there more than a few thousand acres of land under irrigation in the whole United States. Then progress was rapid, and the census of 1890 reported nearly 4,000,000 acres of irrigated land. In 1894 Congress passed the Carey Act, which granted land to the states if the latter would build irrigation works. This law did not prove popular, and in 1902 a national Reclamation Act gave power to the Department of the Interior to construct irrigation systems through the use of funds derived from the sale of public lands in the states mentioned in the Carey Act.

These states (or territories, at the time), were Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North and South Dakota, Utah, Washington, and Wyoming. Later, Texas was added. A Reclamation Service (since 1924 called the Bureau of Reclamation) was created in the Department of the Interior, to take over the executive and financial details of the enterprise. The act provided that ninety-five per cent of the money obtained from the sale of public lands should be devoted to the building of irrigation projects, and that the users of the water should repay the government on a pro-rata basis. These payments were to be extended over ten years, and were not to have interest assessments. The period of payment was subsequently changed to twenty years. Money paid in was to be used again by the government for further construction, thus becoming a revolving fund, and when payments were completed, the projects were to revert to the users.

During the next two decades, the Reclamation Service constructed, or began the construction of, over twenty-five major projects, spending more than \$180,000,000 and bringing under irrigation about 1,169,000 acres of land upon which crops were harvested.



Photo: Riverside Chamber of Commerce

WATER ON THE WAY TO ORANGE GROVES AT RIVERSIDE, CALIFORNIA

The total irrigated acreage was over 1,200,000. An additional acreage of adjacent lands, totaling more than a million, was served with water by virtue of the Warren Act, which permits a partial water supply to be diverted through private canals under special contract. On the other hand, collections during the twenty years amounted to only \$46,000,000. Because of this unfavorable financial showing, the Secretary of the Interior appointed an investigating committee to review the entire situation and make recommendations as to future policies. The commission began its survey in 1923 and made its report in 1924.

The Reclamation Service was reorganized as the Bureau of Reclamation, and in December, 1924, Congress passed an act embodying many of the recommendations submitted by the commission. Among these was a proposal to survey the projects already constructed, and to make an adjustment of unpaid charges. Acting on the advice of the experts who made the proposed survey, Congress in 1926 passed legislation authorizing the definite cancellation of charges against lands classed as unproductive, and the suspension of charges against lands classed as temporarily unproductive. In this manner, the sum of \$14,667,965 was definitely written off the books, and charges

of over \$12,000,000 were held up. The Reclamation Bureau then began a new policy, replacing the old pro-rata contracts with agreements whereby landowners assume joint liability instead of individual liability for construction charges. A maximum repayment period of forty years (without interest) was established for all new projects, for which appropriations approximating \$60,000,000 were made.

What Has Been Accomplished. Including private enterprises, the total acreage in the United States served by irrigation water is between 19,000,000 and 20,000,000. This acreage is found in nineteen states; the states in addition to those mentioned above are Arkansas, Kansas, Louisiana, Nebraska, Oklahoma, and Oregon. About 3,000,000 acres are included in government projects completed or under way. Though the acreage watered by works of the national government is small compared with the total for private undertakings, most of the dams and reservoirs built by the Reclamation Service have been too large for construction by individual enterprise. The Roosevelt dam, shown in an illustration in the article ARIZONA, is the best-known. It is 284 feet high. Arrowrock dam, in Idaho, finished in 1915, is the highest in the world. It has a height of 349 feet, and the reservoir has



"The Desert Shall Blossom as the Rose." Above, typical desert area in Texas and New Mexico which under irrigation was transformed into the lower scene of plenty which became known as the Rio Grande Project.



Photos: Visual Education Service; U & U; P & A

Irrigation in Distant Lands. Upper left, a gigantic water wheel in Syria, turning a stream into an irrigation ditch. At right, the Chinese are shown using irrigation methods employed by their ancestors two thousand years ago. Below, patient, plodding Japanese laborers using a water wheel to send water over rice fields.



Photo: U & U

THIS MICHIGAN FARMER DOESN'T WORRY ABOUT LACK OF RAIN

An example of overhead irrigation in a raspberry field in Muskegon County.

a capacity of 340,000,000 tons of water (see illustration in IDAHO). The largest irrigation reservoir ever built is at Elephant Butte dam on the upper Rio Grande; it will store 3,200,000,000 tons of water, enough to cover the state of New York to the depth of an inch. The dam itself is 306 feet high. The Shoshone dam in Wyoming, 328 feet in height, has a reservoir with a capacity of 550,000,000 tons.

Aside from dams and reservoirs, irrigation projects require many other structures calling for the highest engineering skill. In mountainous regions, concrete tunnels are built to convey water from one level to another, as in railroad construction. A tunnel over five and a half miles long has been built in connection with one of the Colorado projects. Water is sometimes carried across river beds and up and down mountain slopes by means of inverted siphons. In connection with the Yuma project in Arizona, which irrigates the Imperial Valley of California, there is an inverted siphon 955 feet in length, which carries the water under the Colorado River. In some irrigation valleys with abrupt slopes, the water flows so swiftly that it cuts away the sides of the canal. To lessen the rate of flow, it may be necessary to erect

concrete bulkheads across these canals, forcing the water at such points to drop vertically.

Progress in Canada. Though only a very small portion of Canada has as little rainfall as the desert regions of the United States, there is a large area in the West where it has been found wise to irrigate the land. Most of the irrigation systems are small, and all have been built by individuals or companies. The Dominion government grants licenses to those who wish to divert water from rivers, and in one case has assisted with a loan of money, but it does not erect irrigation works.

The largest irrigation system on the American continent has been constructed in Alberta by the Canadian Pacific Railway. The water of the Bow River is diverted from a reservoir near Bassano to 440,000 acres of land. The dam which forms the reservoir is over 7,000 feet long and contains more material than any other in the world except the Assuan dam in Egypt. A picture of the spillway of the dam will be found in the panel which heads the article ALBERTA, and more information about Canadian irrigation is given in the articles ALBERTA, BRITISH COLUMBIA, and SASKATCHEWAN.

In Other Countries. India leads all the world in amount of irrigated land. The war of the British against famines, which coincide with periodical failures of the rainfall, is one of the government's activities that the natives heartily appreciate. Irrigation is an invaluable aid in this struggle to feed the teeming millions of the Indian Empire. Since 1885 great progress has been made in building canals and water-storage projects. India as a whole (including British India and Burma and the Indian states and agencies) has about 40,000,000 acres of irrigated land, and over 55,000 miles of channels.

In Egypt the natives have carried water from the Nile in jars, or raised it with an Archimedean screw, or diverted it to the land with simple dams and canals, for forty centuries or more. Under British control, the productive area has been greatly extended through the construction of modern irrigation works. Egypt proper, except near the northern coast, has no rainfall, and without irrigation the farmers would have to depend solely on the yearly flooding of the Nile. A year of low water would mean famine. In order to provide perennial irrigation, the British began in 1902 the construction of the great Assuan dam, to hold back and store flood waters that could be used during the months of drought. This dam was subsequently enlarged; it now retains a head of water ninety feet high, and has a storage capacity of 2,400,000,000 tons. Irrigating canals convey the water to the fields. Including land watered by older systems of irrigation, 5,400,000 acres are served by the silty waters of the Nile, and it is hoped to increase this acreage to 7,600,000. Among several projects under consideration is one providing irrigation of the Sudan country, through the control of the White Nile (see EGYPT).

Other countries having considerable areas of irrigated land include Russia, France, Italy, Spain, China, Japan, Australia, Iraq, and Mexico. It is estimated that over a hundred million acres of land throughout the world require artificial watering. C.F.C.

Related Subjects. In addition to the articles on the various countries mentioned in this article, the reader is referred to the following: DAM; RESERVOIR; WATERWORKS; INTENSIVE FARMING (Irrigated Land).

IRRITANTS. See POISON.

IRVING, SIR HENRY (1838-1905), an English actor who by virtue of untiring industry and study, and determined adherence to the highest ideals of his art, became the foremost man of the English stage of his day. His real name was JOHN HENRY BRODRIBB; his chosen stage name, Irving, was legalized by royal license.

Irving was born in Somerset, and for a time was engaged as a clerk in London, but he adopted the theatrical profession in 1856.

A spirit of stern determination carried him through discouragements for four years, until he gained recognition in *The Two Roses*. In 1878 he entered upon his memorable management of the Lyceum Theater, where his triumphs were shared by Miss Ellen Terry (which see). Later, he was enthusiastically received in the United States and Canada. In 1895 he was knighted by Queen Victoria. He died in Bradford a few hours after giving a performance of *Becket*.

Irving's Chief rôles.

His repertoire included the masterpieces of dramatic literature, which he presented with strictest reference to historical truth, both as to costuming and time. Among his successful presentations were Matthias in *The Bells*, the title rôles of *Eugene Aram*, *Hamlet*, *Macbeth*, *Richelieu*, *Richard III*, and *Othello*, other Shakespearean characters, and leading parts in *The Corsican Brothers* and in Tennyson's *Becket* and *The Cup*.

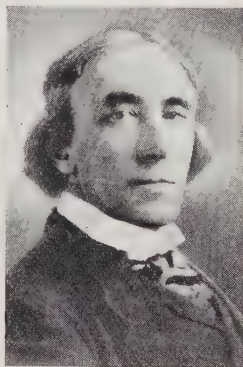


Photo: Brown Bros.

SIR HENRY IRVING

IRVING, WASHINGTON (1783-1859), America's pioneer in the field of general literature. He was born April 3, 1783, in New York City, the youngest of eleven children. His father was a stern Scottish Presbyterian, his mother a gentle English woman, and from both, it seemed, the boy inherited their best traits. But in his youth, especially, there was always in his character a touch of his own later Rip Van Winkle—he never took life quite seriously or saw the necessity of work. The education he obtained in his youth was slight, and because he lacked application, he was never sent to college. At sixteen he entered a law office, only to continue eagerly poring over books of poetry and travel. Symptoms of lung trouble led him to spend much time, also, in rambles over the Sleepy Hollow region and in sails up the Hudson and Mohawk rivers. In 1802, under the pen name of *Jonathan Oldstyle*, he wrote a series of letters for the *Morning Chronicle*; and this, his first real literary work, showed a style worthy almost of Addison.

Beginning a Literary Career. In 1804 Irving sailed for Europe, and, contrary to the expectations of the captain, lived to land, improved in health. On the Continent he roamed about, enjoying the art, literature, and antiquities of France and Italy and gaining the friendship of many eminent people; in 1806 he returned to America, broader in knowledge, culture, and sympathies, but still an idler. He was soon admitted to the bar, but gave

much of his time to social pleasures, and within a short time began, with his brother William and James K. Paulding, to publish *Salmagundi*, a semi-monthly periodical containing essays and sketches of various sorts after the manner of the *Spectator*. This paper was enthusiastically received, but after a score of issues, the editors ceased their work. At about this time, Irving's promised wife, Matilda Hoffman, fell ill and died. After Irving's death, more than a half-century later, a letter in his own handwriting was found attributing to the depth of this early love the lonely bachelor life which seemed so strange for one of his genial nature. To escape his grief, he labored to finish *Knickerbocker's History of New York*, a delightfully humorous and mock-heroic story, which brought him immediate fame and profits.

Growth of Reputation. Literature was not yet generally recognized as a means of livelihood, and Irving still tried to force himself to some surer occupation. The next five years he spent in a business partnership with his brothers, much of the time, however, enjoying Philadelphia and Washington society; for he failed hopelessly at regular work, both in his store and as editor of a magazine. In 1815 he sailed again for Europe—this time to be gone for seventeen years. His book had preceded him, and he was soon a favorite among English authors and society. In the crisis following the War of 1812, his brothers failed, and for the first time Irving's real character appeared; he worked diligently to support not only himself, but his brothers, who were in poor health. Declining regular editorial work, he finished *Geoffrey Crayon's Sketch Book*, his greatest work. The best selections, *Rip Van Winkle* and the *Legend of Sleepy Hollow*, are read in every school as models of story-telling. In 1832, after a visit to France, he published *Bracebridge Hall*, an English "Sketch Book" containing much delicate humor and some charming stories.

After visiting the Rhine country, he published, in 1824, *Tales of a Traveler*, which

maintained his popularity. An invitation from the United States minister at Madrid to translate some Spanish documents turned his attention to the history of Spain, and his *Life of Columbus* at once gave him an honorable place among historians. *The Alhambra* and *The Conquest of Granada* followed, less important historically, but full of vivid and romantic description. In 1829 he returned to England, to serve as secretary of the American legation there. The Royal Society of Literature then awarded him a gold medal and from Oxford came the degree of LL.D.

The Later Years.

Returning to the United States, Irving was enthusiastically welcomed, for he was the first man who had won real recognition for American literature abroad. He purchased "Sunnyside," a country seat near Sleepy Hollow, and there with his nieces spent ten quiet years. He was perhaps the most prominent private citizen of his country, because of his character even more than of his work. Never a strong political partisan, he declined public office, and except for a trip to the Western prairies, spent his time in writing. His work at this time, in book form and for the *Knickerbocker Magazine*, includes *A Tour of the Prairies*, *Captain Bonneville*, and sketches of the homes of Scott and



Photo: Brown Bros.

WASHINGTON IRVING

His books do good to all who read them, and are likely to outlast many works of far greater intellectual force and acumen.—HAWTHORNE.

Byron. While writing a history of Mexico, he learned that the blind Prescott was planning such a work. He courteously abandoned the field, and Prescott never knew of the sacrifice.

For four years Irving served ably as minister to Spain, then gladly returned to "Sunnyside," where the rest of his life was passed. He was a cheery, jolly man, not unlike the Diedrich Knickerbocker he himself had created. His *Life of Goldsmith* is a delightful and sympathetic work, for the two men were much alike in their roving dispositions and their smiling indulgence for the world. After some lesser works, he finished the *Life of Washington*, a well-balanced and impartial biography, and soon afterward died, November 28, 1859. He was buried near Sleepy Hollow.



ISAAC AND REBECCA BEFORE ABRAHAM

From the painting by Schapin

IRVINGTON, N. J. See **NEW JERSEY** (back of map).

IRWIN, the name of two brothers who succeeded in literary careers, one as a writer of humorous sketches and stories, the other as an author of serious works, and as a war correspondent.

Wallace Irwin (1876-) was born in Oneida, N. Y., studied at Stanford University, Calif., and in 1902 became editor of the *Overland Monthly Magazine*. In this publication he printed his *Love Sonnets of a Hoodlum*, and won immediate attention as a humorist. Having resigned from magazine work, he devoted all his time thenceforth to independent writing.

Besides the series noted above, Irwin delighted his readers with *Letters of a Japanese Schoolboy* and *Mr. Togo, Maid of All Work*, and *More Letters of a Japanese Schoolboy*. He also wrote *Venus in the East*, *Pilgrims into Folly*, *The Blooming Angel*, *Suffering Husband*, *Lew Tyler's Wives*, *Seed of the Sun*, and *Mated*.

William Henry ["Will"] Irwin (1873-) was born in Oneida, N. Y., and preceded his brother to Stanford University, from which he was graduated in 1899. He then joined the staff of the *San Francisco Chronicle*, and later that of the *New York Sun*; in 1906 and 1907 he was managing editor of *McClure's Magazine*. A year later, he began to devote his entire time to independent writing. During the World War, however, he went to Europe as correspondent for a group of newspapers.

Irwin wrote *The Hamadryads* (a book of verse), *The City That Was*, *Old Chinatown*, *Confessions of a Con Man*, *Warrior the Untamed*, *The House of Mystery*, *The Readjustment*, *The Red Button*, *Where the Heart Is*, *Men, Women and War*, *Latins at War*, *The Thirteenth Chair* (a play), *A Reporter at Arma-*

geddon, *The Next War*, *Columbine Time*, and *Christ or Mars?*

ISAAC, *i' zak*, the name given in the book of *Genesis* to the son of the patriarch Abraham and his wife Sarah. Like Abraham, Isaac is a figure of the old tradition, but he is a much more shadowy figure than Abraham or Jacob. While many tales which circulated orally a long time before they were committed to writing are told of Abraham and Jacob, Isaac appears to be overshadowed by his father, on the one hand, and by his son Jacob, on the other. The only story that specifically deals with an incident in the life of Isaac, the adventure with Abimelech, who reproached Isaac regarding his wife (see *Genesis* xxvi), is a repetition, with slight variation, of the similar story told about Abraham (*Genesis* xx).

Near the beginning of Isaac's career, however, we have the beautiful story, in which at least he played a part, describing how Abraham sent his servant to the old home in Mesopotamia in order to seek a wife from that place for his favorite son. The story tells us (*Genesis* xxiv) how the servant—whose name is not mentioned—reached the home of Abraham and came to a well about the time when the maidens came out to draw water for the flocks. The servant prayed for divine help to carry out his mission successfully, and decided that the maiden who, upon being appealed to, would allow him to drink out of her pitcher, and would also offer to water the camels accompanying the servant, would be the one destined to be the wife of Abraham's son.

Rebecca, who later proved to be the niece of Abraham, came to the well, and when the servant approached her and asked for water, he received, to his amazement, the answer, "Drink, and I will also water thy camels." The servant, overjoyed, then sought out the family of Rebecca and obtained their consent to allow the maiden to go to Palestine and become the wife of Isaac. The meeting of Isaac and Rebecca, at the close of the chapter, is most charmingly pictured. Rebecca, seated on the camel, saw a man coming across the fields and asked the servant his name. He was Isaac. As he approached, Rebecca, according to Oriental custom, dismounted from the camel and covered herself with a veil. The purpose of the tale emphasizes the opposition of the Hebrews toward intermarriage with the Canaanites, but to us there is a charm about it because of the picture of patriarchal life which it unfolds, which is quite independent of its purpose.

By the side of Isaac there is another son of Abraham, known as Ishmael, and born to him by Sarah's maid, Hagar. Isaac and Ishmael represent the traditional progenitors of the Hebrews and Arabs, who, feeling the close relationship that existed between them, thus regarded themselves as descendants from one and the same patriarch. The Hebrews, for some reason, recognized the Arabic tribes, or Ishmaelites, as older, and therefore Ishmael is the older son, but Isaac became the favorite; and we also see the national pride of the Hebrews cropping out in making the mother of Ishmael the maid of Sarah. That is the way in which ancient tradition pictures an inferior tribe.

The Arabs, too, have stories about Abraham and Ishmael, no doubt brought to them through contact with the Hebrews, but in these stories, Ishmael is always represented as the favorite as well as the older son of Abraham, while Abraham is associated with the traditions of the Arabs, such as the founding of the chief sanctuary of Arabia at Mecca.

Related Subjects. The reader is referred to the foregoing references to *Genesis*, and to the following articles in these volumes:

Abraham Ishmael Jacob

ISAACS, RUFUS. See **READING, EARL OF.**

ISABELLA OF CASTILE, *kas teel'* (1451-1504), the brilliant queen of Castile and Leon, whose marriage to Ferdinand of Aragon (see **FERDINAND V**), in 1469, despite great political opposition, laid the foundation of Spain's future greatness by the union of the two chief Spanish kingdoms. With her husband she waged a ten years' war against the Moors, which ended in 1492 with the capture of Granada and the subjection of all Moorish leaders (see **GRANADA**).

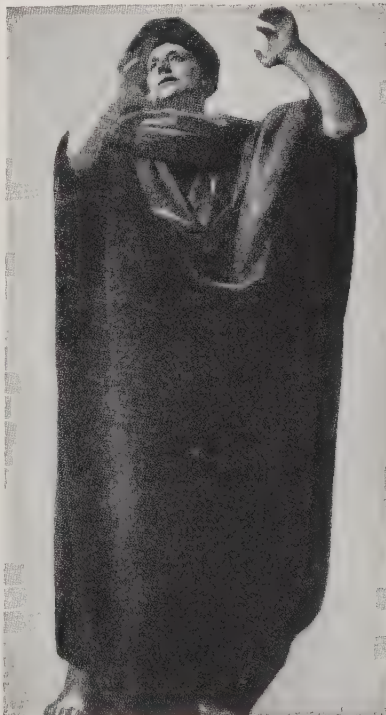
This ousted the Mohammedan religion, leaving Spain a Catholic nation, and it has so been maintained to the present time. Isabella's clear intellect saw merit in the project of Columbus to find a new route to the Indies, and the launching of the enterprise was largely due to her (see **COLUMBUS, CHRISTOPHER**).

[For a map of the kingdoms of Ferdinand and Isabella, see the article **CASTILE AND ARAGON**.]

ISAIAH, *i za' yah* (760-680 B.C.), a prophet of Judah, the first of the line of great Hebrew prophets. Most of his prophecies, which he began in the reign of Uzziah, about 740 B.C., and continued through the reigns of the three following kings, were concerning Judah or Jerusalem, where he lived. Those concerning other nations, such as Samaria, Damascus, or Philistia, were subordinate and were introduced because of their relation to Zion and the people of God. From

the time that Isaiah began his prophetic ministry, he was the adviser of successive kings. In 734 B.C., when Syria and Israel sought to capture Jerusalem, he declared that it was Jehovah's purpose that they should fail, and he tried to prevent Ahaz from uniting with foreign princes, but his counsel was unwisely refused. When Hezekiah began his rule, Isaiah became very prominent in the kingdom, and his opinions on all subjects were received with a great deal of respect. The manner of his death is unknown, although Jewish tradition says he died a martyr.

The Book of Isaiah consists of a series of prophecies, visions, and historical events arranged in order of sequence by its author, after whom the book is named. The first part relates chiefly to the Jewish nation and its enemies, with predictions concerning Assyria, then at the height of its power, and about Babylon, which was just beginning to rise; there are also references to



From the painting by Sargent

THE PROPHET ISAIAH



From the painting by Liszt

HAGAR AND ISHMAEL IN THE DESERT

other foreign nations. The second part forecasts the whole period between the Captivity and the Messiah's birth. The latter portion is so accurate that Isaiah is often called the "Gospel Prophet," although many eminent German critics think that he did not write the last twenty-seven chapters.

The word *Isaiah* is a Hebrew term which means *salvation of Jehovah*.

ISCARIOT, is *kair' ih ot*. For derivation of name, see **APOSTLES** (Judas Iscariot).

ISCHIA, *ees' kyah*, an island. See **NAPLES** (Bay of Naples).

ISERE, *e zair'*, **RIVER**. See **FRANCE** (Rivers).

ISHIKARI, *e' she kah' re*, the longest river of Japan. See **JAPAN** (Physical Features).

ISHMAEL, *ish' ma el*, in Bible story, was a son of Abraham who was driven out into the wilderness with his mother, Hagar, for mocking his young half-brother, Isaac, at a feast. After wandering many days until both were nearly perishing of thirst, they cried to God, who sent an angel to direct them to a spring hidden among the shrubs. Ishmael married an Egyptian woman, and their twelve sons established the tribe called Ishmaelites, as God had promised Abraham (*Genesis* xvii, 20). Mohammed claimed descent from Ishmael, and his followers declare that it was Ishmael and not Isaac who was offered as a sacrifice to God.

Related Subjects. The reader is referred to the above reference to *Genesis*, and to the following articles in these volumes:

Abraham	Bedouins	Isaac	Jacob
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ISHPEMING, *ish' pe ming*, **MICH.** See **MICHIGAN** (back of map).

ISHTAR, *ish' tahr*. See **ASTARTE**.

ISINGLASS, *i' zing glas*, the purest form of animal gelatin, is a tough, whitish, semi-transparent substance prepared from the air bladders of certain species of fish (see **GELATIN**). The best quality of isinglass comes from the Russian sturgeon, but the substance is yielded also by the cod, hake, and other fish. In the preparation of isinglass, the air bladder is taken from the fish and washed in cold water. Then the black outer skin is removed; the rest is washed and spread on a board to dry, the shiny, inner membrane being turned outward. Best results are obtained when the drying takes place in the sun.

When dry, the bladder is moistened in warm water, and the inner skin removed by rubbing and beating. It is then passed between iron rollers, which reduce it to a thin, partly transparent ribbon having somewhat the appearance of watered silk. The semi-transparent sheets used in the panels of stove doors, and incorrectly known as isinglass, are made of the mineral mica (which see).

Isinglass is used extensively for clarifying wines, beers, or other liquors, in countries where those beverages are being produced; the fibrous quality which makes it valuable for the purpose is not a property of other gelatins. The substance is sometimes used in the making of jams, jellies, and soups; and an India ink is made by combining it with water,

Spanish licorice, and lampblack. Isinglass forms part of much glue, court-plaster, and china and porcelain cement.

ISIS, *i' sis*, the chief female deity in Egyptian mythology, the sister and wife of Osiris and the mother of Horus. She was believed to have first instructed the Egyptians in agricul-



ISIS

A bas-relief, an excellent example of Egyptian art.

ture, and was also credited with the possession of skill in magic and in the art of healing. She is variously represented in art; sometimes she is crowned with the horns of a cow, her sacred animal, and sometimes she wears upon her head the sun's disk or a small throne, and carries the lotus scepter. Isis was an object of especial veneration in Memphis, and at a later period became popular throughout all of Egypt, Greece, and Rome. In the latter place, her cult was introduced about 86 B.C., but was brought into disrepute by the misconduct of the priests, and the authorities made several attempts to suppress it. See OSIRIS; PHILAE.

ISLAM, *is' lam*, or *iz' lam*, the name applied by Mohammedans to their religion, which originated with Mohammed. Its literal mean-

ing is *causing to be sound or safe, or that which makes safe*. However, it is generally accepted as meaning complete submission of body and soul to the will of God, or Allah, as set forth in the precepts believed to have been revealed by Allah to His prophet, Mohammed. Western peoples refer to this religion as Mohammedanism, and apply the name Islam to the whole body of Mohammedans. See MOHAMMEDANS.

ISLAND, *i' land*, a tract of land completely surrounded by the water of an ocean, lake, gulf, bay, or river, usually similar to the nearest land mass in respect to physical characteristics and plant and animal life. A group of islands is called an *archipelago*.

Oceanic Islands, such as the Hawaiian group, lie in the open ocean far distant from a continent. They are not connected in any way with any continental mass, possessing characteristics peculiarly their own. They are either composed of coral reefs, built of the limy framework of coral animals, or are masses of land and lava thrown up by the deep-sea volcanoes. The former occur only in warm regions, but the latter may be found in any zone, and sometimes disappear as suddenly as they originated.

Continental Islands, so called because they lie near a continent, are the mountain peaks of sunken ranges, or portions of the continent which are partially covered by the sea. The British Isles are examples of this form; it is certain that at one time they were joined to the mainland of Europe.

Floating Islands are found in inland waters, formed of great masses of earth, driftwood, and intertwined roots, and are sometimes large enough to be used as gardens and pasture lands. Artificial floating islands are made by covering reed rafts with mud, and in China are commonly used for planting rice beds.

Some Islands of Special Interest. Some of the largest islands in the world, and their approximate areas, are given in the table:

Greenland.....	827,300 square miles; nearly four times the area of France.
New Guinea....	300,274 square miles; about three times the area of all the New England states and New York.
Borneo.....	289,860 square miles; five times the combined area of England and Wales.
Baffin Land.....	236,000 square miles; about one-third the area of the province of Quebec.
Madagascar.....	228,000 square miles; about the combined area of North Dakota, South Dakota, and Nebraska.
Sumatra.....	180,000 square miles; three times the combined area of Maine, Vermont, New Hampshire, and Massachusetts.
New Zealand....	103,861 square miles; (total for the two islands); nearly the area of Colorado.

The WORLD'S LARGEST ISLANDS

FIGURES REPRESENT
SQUARE MILES



AUSTRALIA, THOUGH AN ISLAND, AND THE
LARGEST IN THE WORLD, IS CLASSED AS A CONTINENT

Cuba and Haiti, the two largest islands of the West Indies, are the only islands of that group which are politically independent. The Hawaiian and Philippine groups, both of which belong to the United States, and the Dutch East Indies are commercially among the most important of the world's islands.

Related Subjects. The following islands are given special description under their titles in these volumes. They are here classified according to the countries to which they belong:

CANADA	
See under <i>Great Britain</i> , below.	
CHILE	
Juan Fernandez	Tierra del Fuego
DENMARK	
Faroe Islands	Greenland
ECUADOR	
Galapagos	
EGYPT	
Philae	
FRANCE	
Corsica	Martinique
Guadeloupe	Saint Pierre
Madagascar	and Miquelon
GERMANY	
Helgoland	
GREAT BRITAIN	
Antilles	Maldiv Islands
Antipodes	Malta
Bahama Islands	Man, Isle of
Barbados	Mauritius
Bermuda	Newfoundland
Borneo (North)	New Guinea
British Isles	New Zealand
British West Indies	Nicobar Islands
Ceylon	Norfolk Island
Channel Islands	Orkney Islands
Cyprus	Saint Helena
Falkland Islands	Saint Vincent
Great Britain	Scilly Islands
Hebrides	Shetland Islands
Hong Kong	Singapore
Ireland	Tasmania
Jamaica	Trinidad
Jersey	Wight, Isle of
Laccadive Islands	Windward Islands
Leeward Islands	Zanzibar
CANADA	
Anticosti	Prince Edward Island
Cape Breton Island	Queen Charlotte Islands
Magdalen Islands	Sable Island
Manitoulin Islands	Vancouver Island
GREECE	
Crete	Ionian Islands
Cyclades	Melos
Euboea	Salamis
ITALY	
Capri	Rhodes
Elba	Sardinia
Monte Cristo	Sicily
Patmos	
JAPAN	
Formosa	Loo-Choo
Kurile Islands	Sakhalin
THE NETHERLANDS	
Borneo (Dutch)	Moluccas
Celebes	New Guinea
Curacao	Sumatra
East Indies, Dutch	Sunda Islands
Java	
NORWAY	
Lofoten	
PORTUGAL	
Azores	Madeira
Cape Verde Islands	

RUSSIA	
Nova Zembla	Sakhalin
SPAIN	
Balearic Isles	Canary Islands
UNITED STATES	
Aleutian Islands	Mare Island
Catalina	Martha's Vineyard
Dry Tortugas	Melville Island
Ellis Island	Molokai
Florida Keys	Nantucket
Governor's Island	Philippine Islands
Guam	Porto Rico
Hawaii	Pribilof Islands
Isle Royale	Samoa
Long Island	Staten Island
Mackinac Island	Virgin Islands
Manhattan Island	Welfare Island
Manitoulin Islands	
INDEPENDENT	
Cuba	Isle of Pines
Haiti	Santo Domingo
Iceland	
GENERAL ARTICLES	
Archipelago	Malay Archipelago
East Indies	Oceania
Franz Josef Land	Pacific Islands
(ownership in doubt)	West Indies

ISLAND RANGE. See **BRITISH COLUMBIA** (Characteristics of the Surface).

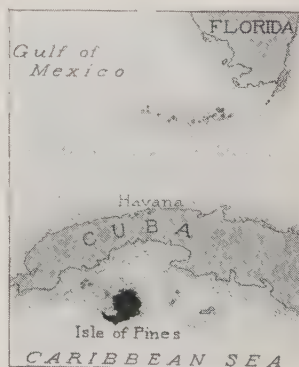
ISLANDS OF LANGERHANS. See **PAN-CREAS**.

ISLAND UNIVERSE. See **STAR** (Stars in Space); **ASTRONOMY** (Distances That Defy the Imagination).

ISLE LA MOTTE. See **VERMONT** (The Land).

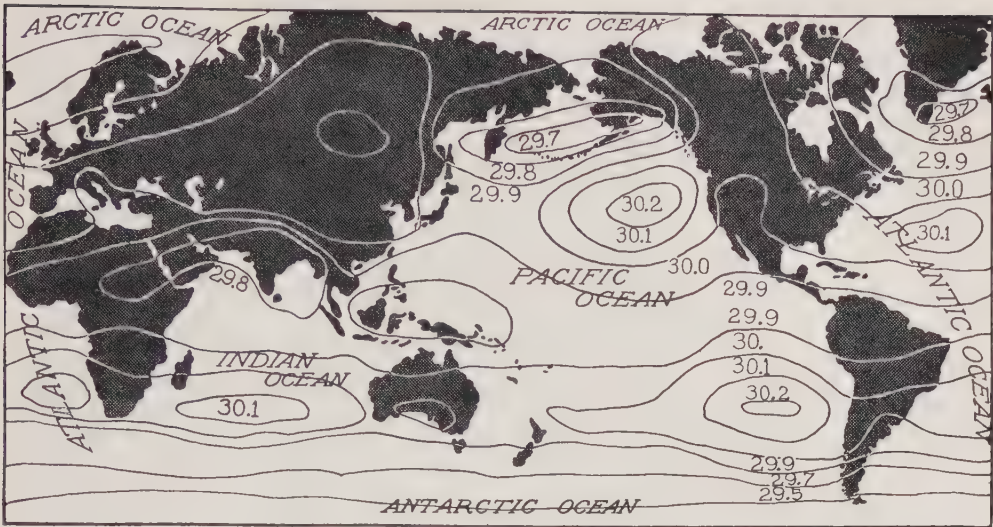
ISLE OF MAN. See **MAN, ISLE OF**.

ISLE OF PINES, a beautiful, wooded little island of the West Indies, 1,180 square miles in area, especially attractive to tourists and settlers on account of its delightful climate and far-famed mineral springs. It is located in the Caribbean Sea, forty miles south of Cuba, to which it belongs. The northern part of this almost circular island is hilly and covered with pine, cedar, and mahogany, but it has soil especially favorable to the growth of grapefruit, pineapples, and potatoes. The southern part is mainly a low marsh. Although there are various mineral deposits, marble quarries are the only portions developed for commercial purposes. Cattle-raising engages some of the inhabitants, but citrus fruits are important sources of wealth. The



ISLE OF PINES

Showing its location with respect to Cuba and the mainland of the United States.



ISOBARIC LINES, SHOWING DAILY AVERAGES IN INCHES FOR A YEAR

population of over 4,000 is centered chiefly in the capital city, Nueva Gerona, and in the town of Santa Fé, where there are modern hotels and sanatoriums. In proportion to population, there are more Americans in the island than in any other island off the American coast.

After the Spanish-American War, the political status of the Isle of Pines was in doubt.



LOCATION MAP

Cuba having given a naval base on its mainland to the United States, a treaty was negotiated in 1904 which confirmed Cuba's claim to ownership of the island, but it was not ratified until 1925. Between these two dates Americans colonized in considerable numbers in the northern section, and their investments totaled about \$15,000,000. They believed the United States Senate would never confirm the treaty, and were of the opinion that the island would remain United States territory, regardless of the recognized merits in Cuba's claims.

ISLE OF WIGHT, *wīl*. See **WIGHT**, **ISLE OF**.

ISLE ROYALE, *īl roy'al*, the largest of a group of small islands in Lake Superior, named for the largest island. They formerly constituted a county, but now form a part of Houghton County, Mich. Isle Royale, which is known principally as a summer resort, is about forty-five miles long and nine miles wide, and has an area of 229 square miles. It contains rich copper mines on the sites of old mines which have been worked by the Indians, and the shores afford excellent fishing grounds. The island is about eight hours' ride by steamer from Duluth, Minn., but is nearer to Port Arthur, Ont. The international boundary parallels the north shore, about eight miles distant.

ISLE SAINT IGNACE. See **ONTARIO** (Surface and Drainage).

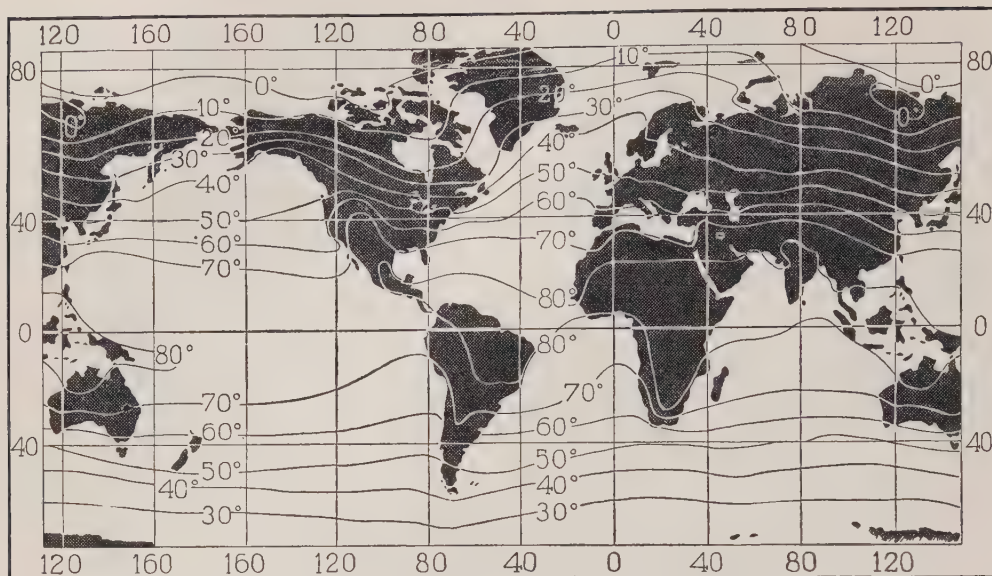
ISLES OF THE BLESSED. See **ELYSIUM**.

ISMAL PASHA, *is' mah eel pah shah'*. See **EGYPT** (Nineteenth-Century Egypt).

ISMARUS. See **ODYSSEY** (The Story).

ISMENE, *is me' ne*. See **OEDIPUS**.

ISOBARS, *i'so bahrz*, or **ISOBARIC**, *i so-bahr' ik*, **LINES**, are lines drawn on weather charts connecting places having the same atmospheric pressure (see **BAROMETER**). Charts showing the areas of high, normal, and low pressure are extremely useful in forecasting the weather, for winds blow toward areas of low barometer, and the direction and velocity of storms can be foretold with considerable accuracy by reference to isobaric charts. The pressure is marked in inches and tenths of an inch. An isobaric map may show the average pressure throughout the year, or for any shorter periods. Weather bureaus issue charts each day showing atmospheric conditions. See **WEATHER BUREAU**; **AIR**. R.H.W.



ISOTHERMAL LINES, SHOWING DAILY AVERAGES FOR A YEAR

Derivation of Term. *Isobar* is from two Greek words meaning *equal* and *weight*.

ISOCRATES, *i sok' ra teez* (436-338 B.C.), one of the ten notable orators of Attica, and distinguished as a teacher of rhetoric and oratory. He was born of a wealthy Athenian family, and was tutored by excellent teachers. His unusually fine mind was recognized by the Greek scholars of the day, and Plato prophesied a brilliant future for Isocrates, while the latter was yet young. Handicapped by a weak voice and stage fright, Isocrates was not active in public life, and instead of delivering the eloquent orations he prepared, he published them in pamphlet form. From about 403 to 394 B.C., he wrote arguments to be used in forensic debates, but he later had a tendency to ignore this period in his life, and referred with scorn to minor civil encounters, while he extolled the greater dignity and importance of political discussions. Isocrates was the first to recognize the value of oratory in public life.

The work for which he was best adapted was teaching, and he set up a school, which made him famous, about 392 B.C. His pupils were well trained in oratory and rhetoric, and among them were some of the foremost orators, historians, debaters, writers, and publicists of that day. Along with his teaching, Isocrates continued to write on topics and problems of the time. Had he lived to-day, he would probably have been a brilliant newspaper correspondent, or an editor specially versed in politics. One cause which he championed above all others was an invasion of Persia by Athens, which he made the theme of his famous *Panegyricus*, published in 380 B.C.

Twenty-one of his orations are still in existence; they are remarkable for their polished style and careful construction. There are English translations, of which those by J. H. Freese are considered standard.

ISOLATING LANGUAGES. See **PHILOLOGY** (Not One Oriental Language).

ISOMETRIC, *i so met' rik*, **SYSTEM.** See **CRYSTALLIZATION**.

ISOPTERA, *i sop' tur ah*. See **INSECT** (Classification).

ISOSCELES, *i sos' e leez*. See **TRIANGLE**.

ISOSTASY, *i sos' ta sie*. See **GEOLOGY**, sub-head.

ISOTHERMAL, *i so thur' mal*, **LINES**, OR **ISOTHERMS**, *i' so thurmz*, are lines drawn upon maps to connect places having the same average temperature. To construct a monthly isotherm map, the geographer must average all the temperatures observed during the month, to find the mean temperature for the month, and connect the places having the same average. The average temperatures of the year would similarly furnish the basis for a yearly map. Since places having the same latitude often vary in temperature (see **CLIMATE**), isothermal lines are extremely irregular. This is true especially of those in the northern hemisphere, where the great land masses are broken by large water areas, for temperatures vary on land and seas in the same latitude. In the southern hemisphere, where the oceans are of much greater extent, the isotherms follow more closely the parallels of latitude.

A line drawn near the earth's equator, through the middle of the belt which has the hottest climate, is called the *heat equator*.

This isotherm connects places having an average temperature of about 80° F. The daily charts issued by weather bureaus contain isothermal lines. See WEATHER BUREAU. R.H.W.

Derivation of Term. *Isotherm* is derived from two Greek words meaning *equal* and *heat*.

ISOTOPES, *i' so topes*. See ATOMIC THEORY; CHEMISTRY (The Elements).

ISPAHAN, *is pah hahn'*. See PERSIA (The Cities).

ISRAELITES, *iz' ra el ites*. See JEWS.

ISRAELS, *ees rah els'*, JOSEF (1824-1911), Holland's greatest modern painter of scenes of everyday life. He depicted the pathos and tragedy in the lives of the humbler classes, notably fisherfolk, and his subjects appeal to all who view his canvases. Israels was born at Groningen, of Jewish parentage. After studying at Amsterdam and at Paris, he began his career as an historical painter, but soon turned to the portrayal of tragic incidents in the lives of the poor. The most notable of his canvases include *The Silent House*, *Alone in the World*, *The Cradle*, and *Toilers of the Sea*. Among several canvases in American galleries is his *Frugal Meal*, now a part of the Vanderbilt collection in the Metropolitan Museum, New York. He also showed great skill as an etcher. See illustration, page 3570.



Photo: Brown Bros.

JOSEF ISRAELS

ISTANBUL. See CONSTANTINOPLE.

ISTHMIAN, *is' mih an*, **GAMES**, one of the four national festivals of ancient Greece, in which trained athletes wrestled and boxed, raced, and threw the discus. These games were held in the southern part of the Isthmus of Corinth, close by a temple sacred to Poseidon (Neptune), in whose honor they are thought to have originated. After 582 B.C. they were held regularly in the spring of the second and fourth years of each Olympiad, or the four-year period between the Olympian Games. The ancient Greek prizes were palm branches and wreaths of parsley; later, the Romans substituted prizes of wreaths of fir. The site of these ancient games is now occupied by the modern town of Isthmia; in the vicinity may still be seen traces of the old stadium. See OLYMPIAN GAMES; FESTIVALS.

ISTHMUS, *is' mus*, a term applied to a narrow strip of land connecting two continents, or a peninsula and the mainland. An

isthmus is frequently a barrier to commerce, a condition which was responsible for two of the largest canals in the world. European merchant craft could find no shorter way to India than around Africa until the Suez Canal was built, cutting the isthmus connecting Africa and Arabia. Similarly, the Isthmus of Panama, connecting the two Americas, made it necessary for boats to sail around South America until the Panama Canal was constructed. See PANAMA CANAL; SUEZ CANAL.

The Isthmus of Corinth, connecting Morea (the Peloponnesus) with Northern Greece, and the Isthmus of Kra, connecting the Malay Peninsula with Siam, are other well-known necks of land. On the former, the ancient Greeks were accustomed to celebrate the Isthmian Games.

R.H.W.

Derivation. *Isthmus* is from a Greek word meaning *neck*.

ISSUS, BATTLE OF. See ALEXANDER THE GREAT (Conquest of the World).

ISTRIA, *is' trih ah*. See map, page 531; RAPALLO, TREATY OF; ITALY (History: Italy and the World War).

ITALIA IRREDENTA, *e tal' yah eer ra den'-tah*. See AUSTRIA-HUNGARY (History); ITALY (History); IRREDENTISM.

ITALIAN LANGUAGE AND LITERATURE.

Italian is the most musical and poetic of all the languages of modern Europe. It has few of the narrow, closed vowel sounds which English has in such plenty in words like *met*, *sat*, or *tin*, and its broad, open sounds and vowel endings make it a joy to singers. Many of the world's greatest operas are written in it, and even those hearers who do not understand the language can feel the charm of the liquid sounds. Grand-opera singers, even those who have acquired only a superficial knowledge of the tongue, prefer to sing in it rather than in any other language, as it displays more perfectly the possibilities of the voice.

History of the Italian Language. Classic Latin was the spoken and written language of the cultured Italians during the Middle Ages, while the mass of the Italian people gradually developed their own dialects from the old "rustic" Latin of popular speech. These separate dialects remain distinct to-day; they exist side by side with the one dialect which was adopted as the literary language. This dialect is the Tuscan, the native tongue of Dante. Cultured people everywhere in Italy at least understand Tuscan, but when they speak it, it is colored by accents and idioms from their native dialects. The perfection of the beautiful Italian language is, traditionally, the language of Tuscany on the lips of a cultivated inhabitant of Rome. Such a combination is said to be almost as musical as singing.



The language of Tuscany, more particularly of Florence, is thus the classical language of Italy; it was established as such by grammarians who chose it chiefly because the "Three Crowns," Dante, Petrarch, and Boccaccio, used it. Modified by several agencies since that time, this form of Italian is still taught in the schools of the country.

The fact that modern Italian is essentially the Italian of Dante's time, and the crystallization of the language early in its history, have imposed certain unfortunate limitations upon it. Just as fast as the civilization of any nation progresses, that country's language must progress, adding new words to its vocabulary and varying its forms, if that is necessary. While this is what actually happens in every language, in Italian the process has been artificially restricted and cramped by the set pattern adopted centuries ago. Italian is still the language of poetry, but it is limited in its power to express the range of modern thought. The comparatively small number of writers which Italy has produced may be partly attributed to this fact.

Italian Literature. When we mention the small number of Italy's literary figures, we must not forget that in these few are some of the world's greatest writers; that for centuries Italy was the foremost country of Europe in literature; and that it has exerted a powerful influence on the history of literature in England and America. The perfecting of the sonnet form in Italy is only one example of the influence that country has had on the development of poetry.

One of the most interesting characteristics of Italian literature is that, slow as it was in appearing, it attained its highest point of achievement almost immediately. The few attempts before the thirteenth century to write in the Italian vernacular had been weak indeed beside the work of Dante, who wrote his masterpieces of poetry in the dialect of Tuscany. The *Comedy*, to which later scholars have prefixed the word *Divine*, is one of the great poems of the world, and it has placed its author as one of the three greatest world poets.

Petrarch and Boccaccio followed Dante, and the three, all writing in Tuscan, determined the literary language of Italy. Petrarch is noted for his perfecting of the sonnet form, and for his beautiful sonnets to "Laura." Boccaccio is remembered for his collection of tales called *Decameron*, which has furnished a pattern for many poems and stories of later generations.

Both Petrarch and Boccaccio showed evidence of the spirit of the opening Renaissance, which was to turn educated thought back to classic Latin and Greek, to delay the formation of the Italian language, and to hinder its literary growth. It was not until the sixteenth

century that Italian was given new impetus by Ariosto's *Orlando Furioso* and Tasso's religious masterpiece, *Jerusalem Delivered*. After these writers, there was again a period of artificiality and emptiness, which was only ended when the new feeling of Italian unity and national patriotism imparted renewed vigor to the literature. Writers, awakening to the new national spirit, were eager to portray Italian life and thought. None of them has become, in a literary sense, a world figure, although Guglielmo Ferrero, a modern historian, has won some fame for his chief work, *Greatness and Decline of Rome*. Gabriele d'Annunzio, poet, novelist, and soldier, is the best-known writer of modern Italy.

Related Subjects. The reader is referred in these volumes to the following articles:

Boccaccio	Italy
Dante Alighieri	Petrarch
Annunzio, Gabriele d'	Romance Languages
Ferrero, Guglielmo	Tasso, Torquato

ITALIAN SOMALILAND, *so mah' le land*. See SOMALILAND.

ITALICS, *ih tal' iks*, the style of type in which this phrase is printed. It was first used in Venice, and is said to be an imitation of Petrarch's writing. The capitals, however, were originally Roman in form. One of Vergil's works was the first book printed in this type, and between 1501 and 1558, six or seven different editions were printed. The use

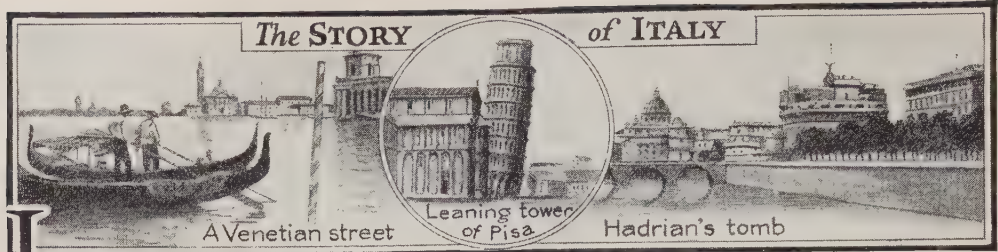
*Sixteenth Century
Lettera Bastarda
By Lucas, (Spanish)*

*SIXTEENTH
CENTURY
CAPITALS
BY SACCHI, (ITALIAN)*

OLD-TIME ITALICS

Specimens of italic faces introduced about four hundred years ago. The names of the originators appear above.

of italic type spread to France, Germany, and England, but eventually it was reserved for introductions, prefaces, notes, indexes and quotations, the body of a text so using it being printed in Roman type. Italics are now employed to indicate special emphasis, or to distinguish specific phrases and words, including names of books, names of ships, foreign phrases, and the like.



ITALY. There is probably no other country toward which the hearts of the people of other lands turn so affectionately as toward this peninsula-kingdom of the blue Mediterranean. It has given to the world so much beauty, and holds in trust so much more in its galleries, museums, and churches; its blue sky and blue waters and bright sunlight breathe so much of the joy of life; its religious associations are so compelling, that even those who have never visited it, except in imagination, feel its thrill. It is the Mecca toward which many a traveler's thoughts turn, and the oft-quoted "See Naples and die" might well be "See Italy and die," so truly is it the land of the beauty-loving tourist.

Full of color and interest, too, are Italy's historical associations, for its story reaches far into the past. In this country the most powerful empire of the ancient world rose and had its day. Rome of the Caesars is gone, but Italy still cherishes their temples and monuments, noble even in their decay. And Italian cities still hold the spell woven in the mysticism and pageantry of the Middle Ages. Farther on in time is the Italy of the Napoleonic wars, then the Italy of liberation and unity, while to-day there is the new Italy of the dictator Mussolini. Whatever period is recorded, Italy's story is always dramatic and vital, and whoever reads it will understand Browning's words—"Open my heart and you will see engraved inside of it—Italy."

What the Map Shows. Italy's position is peculiarly favorable. Comprising the central of the three great peninsulas that extend southward from Europe, the Italian kingdom has about it, on all sides except the north, the waters of the Mediterranean Sea or its great branches, the Tyrrhenian, Ligurian, and Adriatic seas; while to the north it is shut off from the Continent and protected from sweeping northerly winds by the great barrier of the Alps. Before the World War, Austria retained a foothold south of these mountains, where its frontier dipped downward in the region to the north and east of the province of Venice. Sharing in the victory of its Allies in the war, Italy acquired the "unredeemed provinces" so long held by Austria, and its frontier to-day follows without a break the line of the high Alps. On the west, the Maritime Alps

form the boundary between Italy and France; the Swiss Alps mark the Italian-Swiss frontier on the northwest; to the north, beyond the

Rhaetian Alps, lies Austria, now a weak republic; and on the east is the kingdom of Yugoslavia, separated from Italy by the Carnic and Julian Alps. Everywhere else there is water; and what this location has meant to the history and develop-

ment of Italy may be understood only when the vast importance of the Mediterranean as a trade route is comprehended. The peninsula itself is boot-shaped, and just at the toe is the "football" of Sicily, which, with Sardinia, Elba, and about seventy smaller islands, makes up the insular part of the Italian kingdom. A glance at the map will show how nearly the peninsula, with its prolongation, Sicily, forms a bridge across the center of the Mediterranean from Europe in the direction of Africa.

Area and Population. Before the World War, Italy had a total area of 110,845 square miles, exclusive of its colonial possessions but including the islands. The peninsular portion covered an area of 91,161 square miles. By the terms of treaties growing out of the war, the area of the kingdom proper was increased to 119,714 square miles (see section below, *Italy and the World War*), of which the islands comprise about 20,000 square miles. The Italian kingdom is not quite half as large as the state of Texas, but its population, in 1928, 41,173,000, is approximately nine times as great. In Texas there are about twenty persons per square mile. In Italy the density of population is about 350.

Colonies. All of the dependencies of Italy are in Africa. Italy's African holdings were greatly increased by arrangements with some of the allied nations in the decade following the World War. The dependencies are in three sections—Eritrea, with 670 miles of frontage



LOCATION MAP

Showing the place of Italy in the continent of Europe and the proportionate amount of the land surface it covers.

on the Red Sea, an area of 45,754 square miles, and an approximate population of 407,000; Italian Somaliland; and Libia Italiana. For description, area, and population of the latter colonies, see the articles LIBIA and SOMALILAND (Italian Somaliland). It is a part of the ambitious plans of Mussolini, who became dictator of Italy after the Fascist revolution in 1922, to develop these colonies, and he has encouraged Italian emigration to Africa for that purpose.

The People and Cities of Italy

Characteristics of the People. Most of the inhabitants of Italy are of pure Italian stock, but between the natives of one part of the country and those of another, there are very distinct differences. No physical description can be given which will fit them all, but the commonest type is that most familiar to dwellers in America, or

any other country to which Italians emigrate in numbers, the dark-haired dark-skinned type, rather short of stature. Men as well as women are likely to be very good-looking in their youth, but they age rapidly, especially the women, and the injunction, "Look well at the mother before wedding the daughter," might well frighten a suitor who had fixed his fancy on a slim, smooth-cheeked Italian girl.

The love of beauty, whether of nature or of art, is inborn in most Italians, who have behind them the traditions of a long line of artists unsurpassed in the world's history. The lower classes of most countries care little for pictures, but the art museums of any large city will show on Sundays or holidays a goodly proportion of Italian laboring men, poorly clad, perhaps, but looking at great pictures with intelligent and appreciative eyes.

Language and Literature. See ITALIAN LANGUAGE AND LITERATURE.

Art. Except ancient Greece, no other country has played so large a part in the history of art as has Italy. No other painters who have ever lived are worthy to stand beside the great masters whom Italy produced in the dawning days of its modern period, and there were years, centuries even, when no painter

considered himself educated unless he had studied in Italy. In the articles PAINTING and SCULPTURE there are subheads which treat historically of the place of Italy in the world of art.

Religion. Few countries in all the world are so unified religiously as is Italy, for here, at Rome, is the center of the Roman Catholic Church, and to that communion most of the people of Italy belong. Less than five per cent of the population are non-Catholic. After the establishment of the present kingdom, friction between the government and the Church arose, the Pope steadfastly asserting the claim of the Church to the possession of certain extensive territories, which the government as firmly denied. When Rome became the capital of United Italy, in 1871, Pope Pius IX announced that thenceforth he would consider himself a prisoner in the Vatican. The pontiffs who succeeded him likewise pursued this method of protest, but a conciliatory policy was adopted by Mussolini, and in 1929 Pope Pius XI and his advisers, headed by Cardinal Gasparri, the Papal Secretary of State, concluded a pact with Mussolini that ended the conflict. The Pope, with complete temporal power, emerged from his self-imposed exclusion, and became sovereign ruler of a new Papal State (see VATICAN CITY).

Education. At the outbreak of the World War, one person out of three in Italy was unable to read and write; in some sections the percentage of illiteracy was over ninety. A national system of education had been established in 1877, providing for free and compulsory education of children between the ages of six and nine, but the laws were often poorly enforced. During the war, slackness of discipline and instruction permeated the whole school system, and sweeping educational reforms were determined upon by the Fascist government after the revolution of 1922.

According to laws passed in 1923, all public instruction is regulated by the central government, and elementary schools, formerly under municipal control, are directly under the state. Education in the lower grades is compulsory. Elementary schools are classed as preparatory (three years) and higher (two years). Secondary schools are divided into two grades; in the first grade are those giving preparatory courses in technical subjects and in teacher training, and in the second grade are those offering higher technical, scientific, and teachers' courses. There are twenty universities under state control, many of them founded in the Middle Ages; and five so-called free universities. These twenty-five institutions are attended annually by over 30,000 students. There are, besides, numerous schools and colleges of commerce, engineering, forestry, and other technical and vocational branches.



COMPARATIVE AREAS

Italy, including its islands, has 110,845 square miles of territory; Nevada has 110,690 square miles.

The Fascist Ministry of Education weeded out incompetent teachers, consolidated offices for greater efficiency, and instituted strict disciplinary measures. The university courses of study were not changed, but professors and officials opposed to the new régime were dropped or resigned voluntarily. Instruction in Catholic doctrine was introduced into the lower grades. These courses are given during the first five years.

The Cities. For beauty of location, charm of antiquity, artistic distinction, and literary association, the cities and towns of no other country can vie with those of Italy. Under separate headings, in these volumes, the reader will find descriptions of Fiume, Florence, Genoa, Herculaneum, Milan, Naples, Pompeii, Rome, the capital, Turin, and Venice. Others are described below:

Amalfi, *ah mahl' fe*, a picturesque town on a precipitous headland overlooking the Bay of Salerno, is situated in the department of Campania, about twenty-two miles southeast of Naples. Tier on tier its houses rise from the sea to the mountains in the background (see illustration opposite). Though primitive in its living conditions and backward industrially, Amalfi is the delight of tourists, who travel there from Sorrento over a winding automobile road commanding magnificent views of the sea. An eleventh-century cathedral and an old Capuchin monastery, now used as a hotel, are the chief points of interest. In the Middle Ages, Amalfi was a powerful city state of 50,000 inhabitants. The present population is about 5,200, and fishing and the making of macaroni are typical industries.

Arezzo, *ah ret' so*, lies fifty-four miles southeast of Florence, on a beautiful hillside commanding a charming view of the surrounding fertile country. The city is the episcopal see of Tuscany, and its cathedral, a fine example of Italian Gothic begun in the thirteenth century, is among the attractions of

the city. Arezzo has manufactures of cloth, silk fabrics, and leather. In ancient times, then called Arretium, it was one of the richest cities of Etruria, and was especially famed for its pottery and copper work. The city was the birthplace of Petrarch and other famous men. Population (city and suburbs), about 58,000.

Bari, *bah' re*, is a seaport on the Adriatic coast of Southern Italy, noted for its extensive commerce and manufactures. As early as the third century B.C., Bari

was a place of importance; it has been three times destroyed and rebuilt. Several ancient churches remain, including a massive cathedral and the Church of Saint Nicholas, the latter founded in 1087, and visited annually by thousands of pilgrims. In July, 1915, during the progress of the World War and soon after Italy joined the Allies, the town of Bari was heavily bombarded by the Austrian fleet, much damage being done to the docks and buildings. A United States consul is stationed here. Population, about 174,000.

Bologna, *bo lohn'-yah*, located in a region of beautiful climate and fruitful soil, in Northern Italy, is an important industrial center, manufacturing silks, velvets, and the widely known Bologna sausage. Although the inhabitants are progressive and industrious, the city, with narrow and crooked streets, still maintains a medieval appearance. One of its most

striking features is the system of arcades, which, extending far in all directions, shelter the shops on each side of the street. Bologna has 130 churches, dating from the early part of the eleventh century down to the modern era. Of the 180 leaning towers which ornamented the city in the Middle Ages, only two, dating from about 1110, remain.

The art treasures of Bologna are world-renowned; the most famous of its pictures is Raphael's *Saint Cecilia*, painted for the Church of Saint Giovanni in 1515. Bologna is an ancient seat of learning in Italy. Its university, founded in 1088, is one of the oldest and most famous schools in the world. Population, 240,000.



Anderson, Rome

VILLA D'ESTE

One of the most beautiful spots in all Italy. It is at Tivoli, a town of about 40,000 people, about fifty miles from Rome. To reach the spot by motor car, one passes Hadrian's Tomb. In the gardens of the villa are three hundred fountains and beautiful landscaping. In order to preserve it for future generations, Mussolini ordered its restoration.



U. & U. Photo

AMALFI, CLINGING TO BOLD MEDITERRANEAN HEADLANDS

Leghorn, in many respects the least Italian of all Italian cities, ranks next to Genoa and Naples as the busiest seaport in the kingdom. It is situated on the Mediterranean, about sixty-two miles west of Florence. Leghorn hats, made from the straw of wheat growing in the vicinity, and beautiful coral ornaments are exported from here, as well as marble, olive oil, boracic acid, silk, and wine. Though modern and well built, Leghorn resembles Venice in that it has numerous canals.

The most interesting of its public buildings include the Cathedral, a Jewish synagogue, the Academy of Sciences, and the naval academy. The "Tower of the Sculptured Lion," one of the leading landmarks, is the only relic of the days when the city was a free port.

Leghorn was a mere fishing village when it came into the possession of the Florentines in 1421. Since those days it has grown in importance and prosperity, attaining a population of 122,000. In season, the sulphur springs and sea bathing attract many visitors.

Lucca, *look' ah*, known as *Lucca the Industrious*, is a picturesque old city situated in the northern part of Italy, thirteen miles northeast of Pisa. It is noted for its numerous old churches, some dating back to the seventh and eighth centuries, and for its artistic and scientific institutions. The city has an extensive trade, particularly in olive oil and textiles. On the site of a large Roman amphitheater is the modern city market. The surrounding country abounds in beautiful villas. Sixteen miles north of the town are the Baths of Lucca, celebrated since the fifteenth century. The population of the city is about 80,000.

The province of Lucca is noted for the fertility of its soil. Originally belonging to Etruria, Lucca fell in turn to Rome, Spain, Tuscany, and finally in 1860 it became a part of United Italy.

Messina, *mes e' nah*. See SICILY (The Cities).

Modena, *mo da' nah*, lies in a fertile plain of Northern Italy about twenty miles south of the Po River. Modena is the ancient Mutina that the Romans captured from the Boii in 215 B.C. It was almost wholly destroyed by the Huns in the fourth century, and the ravaging Lombards later completed its devastation. In the eleventh century, it was re-founded by Mathilda of Tuscany, who began the construction of its splendid cathedral. The later Dukes of Tuscany built several fine palaces which are now used as schools, museums, and art galleries, for which the city is noted. Modena has a small trade in linen, silk goods, and iron. Population of city and suburbs, 91,500.

Padua, *pad' u ah*, the oldest city of Northern Italy, is situated on the Bacchiglione River, twenty-two miles southwest of Venice. It is a city of seven gates, and has narrow, crooked streets, many of them lined with arcades; several high Roman bridges cross the various arms of the river, and there are numerous medieval palaces and churches. Padua's art treasures perpetuate the memory of some of Italy's greatest masters—Dona-

tello, Guido Reni, Canova, Giotto, Fra Filippo Lippi, and others. In its famous university, which was founded in 1222 by Emperor Frederick II, Galileo lectured for eighteen years. A celebrated Botanic Garden, the oldest in Europe, is connected with the university.

Livy was born in Padua, and at one time it was the residence of Dante. At the present time it has considerable industrial importance, possessing a flourishing automobile factory and a prosperous trade in fruit, grain, oil, wine, and cattle. Population of city and suburbs, 125,000.

Palermo, *pah lur' mo*. See SICILY (The Cities).

Parma, *pahr' mah*, a town of Northern Italy, dating from the period of the Roman republic, is interesting as the home of many notable art treasures. The cupola of the eleventh-century cathedral, an example of Lombard-Romanesque architecture built in the form of a Latin cross, contains Correggio's celebrated fresco, *Assumption of the Virgin*, and there are many other great paintings in the city. Parma was the home of Correggio for many years. The most notable educational institution, the University of Parma, was founded in the sixteenth century.

The city lies on a small stream, also called Parma, and is seventy-five miles southeast of Milan. The fortifications have been replaced by promenades. The site of the place was originally occupied by a village of the Bronze Age. Population of town and suburbs, about 72,000.

Pavia, *pah ve' ah*, is the seat of a university founded before the twelfth century. In the days of the ancient Romans, the city was known as TICINO, and was a place of considerable importance. Pavia figured prominently in the wars of the Middle Ages, and was plundered by Napoleon in 1796.

Modern Pavia is situated on the Ticino River, near its conjunction with the Po, eighteen miles south of Milan. The place is still surrounded by its ancient walls, and has the general aspect of a city of olden times. Its medieval castle is now used as a barracks. The oldest of the many interesting churches is the Church of San Michele. In the cathedral Church of San Martino is a sarcophagus containing the ashes of Saint Augustine, and north of the city is the finest monastery in the world, the Certosa di Pavia.

Industrially, modern Pavia is known for its manufacture of organs, and for its trade in wines, silk, oil, and cheese. It has a population of 50,000.

Pisa, *pe' sah*, or *pe' zah*, a city of Tuscany famed for its beautiful marble bell tower (see PISA, LEANING TOWER OF). It is situated on both banks of the River Arno, six miles from the Mediterranean Sea and forty-nine miles west of Florence. Pisa contains a university founded in the fifteenth century and an academy of fine arts, established by Napoleon, and the town possesses many valuable art treasures. The house where Galileo was born is a feature of special interest. Industrially, the place is important as a center of cotton manufacture, and



Photo: U & U

it has a prosperous trade in oil and marble. The population is about 77,200.

Taranto, *tah' rahm loh*, a fortified city and seaport in Southern Italy, situated on a rocky island lying between the Gulf of Taranto and the Little Sea, an inlet of the gulf. The place occupies the site of Tarentum, one of the leading cities of the ancient Greek world. For centuries Taranto has been famous for its oyster and mussel fisheries, which give employment to great numbers of inhabitants. An esplanade extends along the shore, but the town is poorly built, with narrow streets and small houses. Taranto is an important maritime arsenal and torpedo-boat station. The population is about 121,000.

Trieste, *tre es' tay*, or **Triest**, *tre est'*, a flourishing manufacturing city at the extreme northeastern angle of the Adriatic Sea, on a small, crescent-shaped bay called the Gulf of Trieste. The city is about seventy-three miles northeast of Venice and 367 miles southwest of Vienna. Previous to the World War, Trieste belonged to Austria-Hungary and was the objective point of the great Italian drive under General Cadorna, in the summer and fall of 1917. The city was ceded to Italy after the war.

Having a spacious and up-to-date harbor, Trieste is an important shipping point, and possesses a naval arsenal and a nautical academy. There are two sections to the city—the old town with steep, narrow streets, clustered about the Schlossberg (Castle Hill), and the new portion, on the flats along the bay. The Corso, the city's busiest throughfare, divides

these two sections. The population of the city, numbering about 250,000, consists chiefly of Italians.

Verona, *ve ro' nah*, is picturesquely situated at the foot of a spur of the Tyrolean Alps, seventy-one miles by rail west of Venice. In literary history it is celebrated as the reputed home of Romeo and Juliet, and the house in which Shakespeare's heroine is said to have lived is pointed out to credulous sightseers.

In its general aspect Verona presents a fascinating combination of ancient, medieval, and modern civilizations. The city was a prosperous Roman colony before the beginning of the Christian Era, and there still remain many interesting Roman ruins, including a magnificent amphitheater, built by the Emperor Diocletian. During the Middle Ages, Verona was an art center of first rank, and numbered among its native sons the great Paul Veronese.

Modern Verona has many busy industrial establishments and an active trade in wine, fruits, and marble. During the World War, the city was several times bombarded by Austrian airships. Population, about 152,000.

Vicenza, *ve chen' tsah*, is a picturesque city about forty miles northwest of Venice. It is enclosed by a moat and walls, now almost in ruins. To the famous architect Palladio, a native of Vicenza, the city is indebted for many of its finest buildings. The Duomo, a fine Gothic church dating from the thirteenth century, is enriched by many paintings of ancient masters. The city has several educational institutions and important silk manufactures. Population of Vicenza (commune), 67,000.

The Land: Resources and Development

Coast and Surface. Italy proper has a coast line of 2,472 miles, which the islands bring up to 4,968 miles. The long, slender peninsula, which measures 708 miles from northwest to southeast, is only 100 miles wide on an average, through the "leg of the boot," and no place on the peninsula proper is more than sixty miles from the sea. The most beautiful section of the coast is the western, which is high and rocky, save in the occasional places where marshes run down to the sea, and which possesses a number of excellent harbors. The southern coast, too, is bold and picturesque, but on the east there are great stretches of sand, and fine harbors are few.

The mountains of the mainland fall into two groups—the Alps, to the north, and the Apennines, the "backbone," which run the entire length of the peninsula. Though the highest summits of the Alps do not lie in Italy, the Italian Alps present some exquisite scenery, with their snow-crowned peaks, their steep slopes dropping abruptly to the plains of the Po, and their beautiful blue lakes. The Apennines nowhere attain a greater altitude than 9,580 feet, but their ruggedness gives them a peculiar strength and dignity, and much of the same appeal possessed by far more lofty ranges (see APENNINES). With their various systems, they divide Italy into an eastern and a western slope, leaving little space for plains of any considerable extent.

The islands of Italy are likewise mountainous. The only large plain in the entire kingdom is that of the Po, in Lombardy. This is shut in by a great curve of the Alps, and has an extent of about 37,000 square miles. It is here, chiefly, that agriculture and other industries flourish, and here that the population is densest.

Rivers and Lakes. The only large river of the kingdom is the Po, into which the melting snows of the Alps and the rains of the Apennines pour their floods. This statement does not mean that Italy is not well watered, for it has many smaller streams, including the Adige, the Arno, the historic Tiber, the Brenta, and the Tagliamento. There are also many mountain streams which are rushing torrents in the season of rains, and a valuable source of electrical power.

Italy has to-day but one active volcano, Vesuvius, the only one, indeed, in continental Europe; but that it once had many more is proved by the abundance of craters, a number of which now contain lakes (see AVERNUS). The most famous of Italy's many lakes, however, are those of the Alpine country—Garda, Maggiore, Como, and Lugano. All are noted for the grandeur of the scenery about their shores, and the exquisite coloring of their waters. Garda is the largest lake wholly in Italy. Maggiore and Lugano lie partly in Italy and partly in Switzerland. Como is



Photos: U & U

Interesting Italian Scenes. At left, a courtyard in Trapani, Sicily. The houses are generally built around a central courtyard; in it are kept the domestic animals of the families of the building, and it serves as a meeting-place for neighborly gossip. At right, a view of the Matterhorn from an Italian valley.

thought by some to be the loveliest body of water in the world; with Lake Lugano it is often compared with that beautiful gem of the Canadian Rockies, Lake Louise. Boats ply on these lakes, picturesque villas climb the slopes about their shores, and modern hotels in delightful towns invite the patronage of tourists.

Climate. While the icy Alps chill the extreme northern border, "Sunny Italy" is a truly appropriate name for the greater part of the peninsula, with its clear air, dazzlingly blue sky, and preponderance of sunshiny days. There are sections in which pestilential vapors rise from the marshes, but the work of reclaiming these swamps by drainage is steadily going on. The extreme southern portion of Italy, with its hot, dry winds (see *SIROCCO*), is more like Africa than like Europe. It is an interesting fact that Italy, with its generally mild climate, is in about the same latitude as the American coast from Delaware to Maine.

Some districts have a heavy snowfall, and almost everywhere there is a rainfall that would be sufficient for agriculture did it not occur chiefly in the fall and winter months. As it is, irrigation must be practiced almost everywhere.

Mining. So mountainous a country might be supposed to have great mineral wealth, but the contrary is true. There is almost a total absence of coal, a lack that has been partly overcome by an enormous development of hydroelectric power (see paragraph below under *Manufactures*). But Italy is rich in one mineral product, for it furnishes the great proportion of the world's supply of sulphur. Most of this comes from Sicily, while most of the zinc and lead is mined in Sardinia and most of the iron in Elba. Copper, quicksilver, and a little gold, silver, and antimony complete the list of metals, but there is one non-metallic mineral product for which Italy is famous the world over—its beautiful Carrara marble (see *MARBLE*). There are important deposits of quicksilver in the reclaimed Austrian territory, and these are being profitably mined by Italians.

Manufactures. Scarcity of coal and lack of raw materials have tended to hinder Italy's broad industrial development, but these disadvantages have been offset to some extent by the special characteristics of the people. Italian workers are sober and industrious, and they have a particular aptitude for trades requiring skill of hand, applied intelligence, and a feeling for beauty. Italy has long been famous for its production of such articles as ivory carvings, marble and alabaster pieces, mosaics, enamels, jewelry and filigree work, fine pottery, lace, and embroidery. The making of straw goods, such as Leghorn and Milan hat braids, is also a characteristic Italian industry. In enterprises such as these, thousands of women and girls find employment.

In the northern part of the country, the growing of silkworms and the spinning and weaving of silk engage a large proportion of the working population, both men and women. The silk industry, however, is carried on in all parts of Italy. Other textile industries also flourish, and there has been a steady development of woolen and cotton manufacturing since the outbreak of the World War. In one particular line of the textile trade, the manufacture of rayon, Italy is one of the leading countries of the world.

Other established lines of manufacture are the production of foodstuffs, such as macaroni, olive oil, beet sugar, and preserved vegetables; the manufacture of hosiery, clothing, rubber, chemicals, and iron and steel products; shipbuilding; and the making of airplanes and automobiles, in the technique of which Italian engineers are highly efficient. Shipbuilding has progressed to such a point that Italy now is one of the leading nations in size of merchant marine.

Two factors have operated to stimulate industrial activity in late years. One of these is the immense development of hydroelectric power, which was trebled during the decade after the outbreak of the World War and is being pushed with great vigor. This increase is equivalent to an annual saving in coal consumption of millions of tons. The other factor is the stern policy of the Fascist government in enforcing peace between capital and labor and in exercising strict control of wages, working hours, and other labor conditions. In adjudicating disputes, court procedure must be based on the Labor Charter which was promulgated by Mussolini in 1927, and which lays down the basic principles governing industrial relations, and defines the rights and protection of labor under the Fascist order.

At the same time, the fact of overpopulation and the necessity of importing raw materials give rise to serious problems. Italy's density of population is aggravated by a natural increase of 500,000 a year; the outlet to North America, which formerly took care of a part of the surplus population, has been cut off by restrictive immigration laws, and industrial conditions in Argentina and other countries that could absorb a large immigration are not so favorable as in the United States.

Agriculture. This is by all means the foremost industry, and the range of latitude in the long peninsula makes it possible to grow many different crops. Even though the country is mountainous, over ninety per cent of the land is productive, and over half of the people are engaged in agriculture. Drainage of marshlands and irrigation of arid regions are constantly going on, steadily increasing the area of tillable soil. The great plain of the Po, in



Colorful **Lake Lugano**. Above, a typical Italian town descending the hill to the heavenly blue of the lake
Below, Monte San Salvatore, at the right, rising 3,000 feet from the water's edge. 3579

Lombardy, is the most important agricultural region; it is now one of the most fertile sections in the world.

Of all the products, fruits of various kinds are most important. Almost one-sixth of the entire area of the country is under vines, and although Italian vine-growers, like the French, have had to fight against the troublesome disease known as phylloxera (which see), vine-culture is increasing. Millions of gallons of wine are made each year, but much of it is of an inferior quality. Scarcely less important than the vine is the olive tree, in the growing of which Italy is the chief country in the world. Oranges and lemons of most excellent quality thrive in the warm, sheltered regions; Sicily and Sardinia have great groves of almonds, and figs, dates, melons, almost all subtropical fruits, in fact, are grown in large quantities. Corn on the northern plain, and wheat in the more southerly regions, are the chief grains, though rice, barley, and oats are of increasing importance. In spite of a large production, wheat is not raised in sufficient quantities to supply the home needs, and 2,000,000 tons are imported annually. Beets are grown in large quantities for sugar, and vegetables of various kinds in sufficient amounts to supply the home demand. A very special importance attaches to the growing of the mulberry tree, on which feed the myriads of silkworms which are the basis of one of Italy's chief industries.

Only in northern Italy, which is in general far more advanced and progressive than the southern portion, is stock-raising carried on scientifically. From this dairy region come those famous varieties of cheese, the Parmesan and Gorgonzola.

Farming in Italy is based in general on a system of small holdings, many of which are rented on shares. The area of these farms ranges from twenty-five to fifty acres. Formerly, the terms on which the land was let were far from advantageous to the tenants, and most of them were painfully poor despite their industry. Under the Fascist régime, efforts were made to better conditions for the

peasants. The ideal sought for was to have the landlord supply the machinery, tools, and land, and in return receive half the crop. The use of modern implements, including tractors, and more advanced methods of cultivation are gradually being introduced. Nowhere else in Europe do the farmers make so much of so little as in Italy. It is there that intensive farming is developed to the highest degree.

The International Institute of Agriculture has its headquarters in Rome.

Transportation and Commerce. Italy has a total railway mileage of about 13,400, of which 10,248 miles are owned and managed by the government. Under Fascist control, trains are run efficiently and on time, and economies in administration, together with increases of rates, have converted an annual deficit into a profit. The government has begun the electrification of 4,000 miles of state-owned roads. Italy has such easy access to other countries by water routes that there has been little incentive toward developing trunk lines connecting with neighboring lands.

Italy's import trade is considerably greater than the volume of exports, a condition that has always worked to its disadvantage financially. Coal, iron, steel, cotton, wheat, and other vital materials must be purchased from other countries. This adverse trade balance is somewhat offset by the heavy expenditures of tourists, especially in summer, when American travel is heavy, and by freight profits earned by the rapidly expanding merchant marine. Formerly, Italy's thrifty emigrants in the New World could be counted upon to add to their country's prosperity, but this source of revenue was practically lost when the United States rigidly limited immigration quotas for all countries.

The principal countries with which Italy maintains trade relations are the United States, Great Britain, France, Germany, Argentine Republic, Yugoslavia, Austria, Switzerland, and Czechoslovakia. Silk and other textiles, fruits, wines, and objects of art are leading exports.

History and Government

The Middle Ages. Not always has the peninsula of Italy been a united nation, nor can its entire history be treated under the title *Italy*. Until 476, when Rome fell before the barbarians, the history of Rome was the history of Italy; but Odoacer, who set up his government on the ruins of the empire, called himself not emperor of Rome, but king of Italy. In 493, Theodoric the Great, king of the Ostrogoths, overthrew Odoacer, and until 526 ruled wisely and well, giving to Italy such a period of prosperity as it did not see again for centuries.

For a time after the downfall of the last Gothic king, in 552, Italy was a dependency of the Byzantine Empire, but the boundaries of the Byzantine territory in the peninsula continually contracted before an advancing Germanic tribe, the Lombards. Finally, these invaders threatened Rome itself, and the Pope called to his aid Pippin, leader of the Franks, who checked the Lombard advance. Charlemagne, Pippin's son, completed the conquest of the Lombards and had himself crowned with the famous Iron Crown. He also confirmed the gift of certain lands which his



Picturesque Naples. Street scene in Porta Noalo, a very old part of the famous city.

father had given to the Pope; this was an event of great moment, since it marks the beginning of that temporal power of the Popes which brought about such lasting controversy. Charlemagne's assumption in 800 of the title of emperor resulted in those claims of the German emperors on Italy which wrought such great hardship for both countries in the centuries that followed.

Division and Anarchy. The Treaty of Verdun in 843 gave Italy to Lothair, but no settled government followed; Greeks, Saracens, great nobles, almost any ambitious party that arose, worked their wills upon the country. Otto the Great, crowned Holy Roman Emperor in 962, put an end to this period of anarchy, and throughout the Middle Ages the emperors were the nominal rulers of Italy. Resenting this rule by the Germans, however, the Italians stirred up constant revolts, and many of the emperors had to fight hard to maintain their authority. But the strongest opponents the emperors had in Italy were the Popes, who resisted firmly any imperial attempts to lessen the Papal power.

Period of City States. Meanwhile, a new force was arising in Italy—the city states—which for a time made in large measure the history of the peninsula. Milan, Genoa, Florence, Pisa, Venice, and other cities made themselves practically independent, and about them as centers a brilliant life grew up. Resisting not only the nobles who sought control over them, but the emperor himself, they flourished and grew strong, and this might have been a period of glory and prosperity for Italy had it not been for the feuds and rivalry of those two famous factions known as the Guelphs and the Ghibellines. In every city the struggle raged, and only as some powerful family of nobles made itself supreme in each city, and established a despotic government, was even a measure of peace secured.

The power of the emperors had greatly decreased, and in the south had been replaced by a new authority, that of France; for, in the latter half of the thirteenth century, Charles of Anjou, the brother of the French king, had set up for himself a realm known as the Two Sicilies. French rule proved too despotic, however, and later in the century, Sicily and Naples submitted themselves to Aragon, a kingdom of Spain (see CASTILE AND ARAGON).

Age of Invasions. This age of the despots, as it is called, when the cities with such men as the Florentine Medicis at their head were really the only important part of Italy, lasted from the middle of the fourteenth to the end of the fifteenth century. Then, just as the modern age was really beginning for the world, just at the time when the western hemisphere was being discovered and explored, a change came for Italy. It became the prey, not of

ambitious princes within, but of ambitious countries without. The German emperors, renewing their efforts to gain the old ascendancy, were opposed by the kings of France, of whom the first actually to invade Italy was Charles VIII. He entered the peninsula in 1494, made himself master of Naples, and was crowned king there. On his withdrawal his influence practically ceased, but he had turned the attention, not only of France but of other nations, to Italy, which seemed a prey too feeble to resist invasion. French kings and Spanish kings seized what territories they would, the petty states of the peninsula being too selfish to unite in the common defense.

But a stronger ruler than any mere French king was coming to the fore in European affairs; this was the Emperor Charles V, who, in 1525, by his victory at Pavia, forced Francis I to give up his ambitious schemes. Then German and Spanish troops ravaged the peninsula, took Rome by assault, and wrought havoc among its many treasures. Under the domination of Charles V, Italy enjoyed a period of comparative peace, though its liberties were curtailed until all its states were practically dependencies of the Holy Roman Empire. The largest measure of freedom was accorded the Papal States, which were at this time the most important part of Italy. And now, for more than two centuries, Italy had really no history. Its territories were prizes, fought for by the monarchs of Europe, quarreled over by the petty Italian princes. Sometimes armies invaded it and fought on its soil, but there was no Italian army to oppose them; there was no Italian life in the strict sense of the word. Most of the old ducal families which had held sway with such magnificence in the days of the city states were dying out ingloriously, and it seemed as if nowhere in Italy was there any state, any family, which later might serve as a nucleus for a united nation.

Almost unnoticed, however, there did exist such a family, the House of Savoy, the very oldest reigning house in Europe, which held first Piedmont, and later, after the War of the Spanish Succession, received Sicily as well. Still later, Sicily was taken away from the Savoy possessions, and Sardinia was given in exchange, and it was the growth of a real Italy around this apparently unpromising center which developed one of the romances of nineteenth-century history.

The French Revolution. Italy still lay torpid, however, submitting with scarce a protest to Bourbon and Hapsburg rule. But during the latter part of the eighteenth century, the awakening was beginning, for the same forces which resulted in the great revolution in France also made Italy restless. When the French Revolution actually broke out, Italy attempted



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How to Read a Map: See page xvi, facing text page 1.

ITALY

Abruzzi e Molise (department), 1,387,215	D 3	Chieti, 29,219	E 3	Manfredonia, Gulf of	F 4	Rovereto, 15,983	C 2
Acireale, 35,161	E 6	Chioggia, 36,104	D 2	Mantua, 36,633	C 2	Ruvo di Puglia, 27,086	F 4
Acqui, 35,081	B 2	Circeo, Mount	D 4	Marches (department), 1,145,685	D 3	Salerni, 19,374	D 6
Aderno, 39,765	E 6	Citta di Castello, 30,018	C 3	Marrargiu, Cape	B 4	Salerno, 51,980	E 4
Adria, 19,827	D 2	Civitavecchia, 23,114	C 3	Marsala, 72,565	B 3	Salerno, Gulf of	E 4
Adriatic Sea	D 2	Colonne, Cape	F 5	Martina Franca, 33,530	F 4	Salina Island	E 5
Aegades Islands	D 5	Comino, Cape	C 4	Massa, 34,166	B 3	Saluzzo, 15,680	A 2
Afragola, 23,642	E 4	Comiso, 32,166	E 6	Massa Marittima, 15,484	C 3	San Cataldo, 21,540	E 6
Agira, 24,697	E 6	Como, 48,066	B 2	Mazzara del Vallo, 21,937	D 6	San Miniato, 21,398	C 3
Alcamo, 63,051	D 6	Corrado, 22,364	C 2	Mediterranean Sea	C 6	San Pier d' Arena, 52,177	B 2
Alessandria, 78,278	B 5	Corato, 48,956	F 4	Mele, Cape	B 3	San Pietro Island	B 5
Allice, Point dell'	F 5	Corigliano Calabro, 15,467	F 5	Messina, 176,405	E 5	San Remo, 23,547	B 3
Alps, The (mts.)	B 1	Corleone, 15,329	D 6	Messina, Strait of	E 6	Santa Maria Capua Vetere, 22,761	D 4
Altamura, 27,165	F 4	Cosenza, 30,028	E 5	Mestre, 22,469	D 2	Santa Maria di Leuca, Cape	F 5
Ancona, 66,291	D 3	Cuneo, 31,221	A 2	Milan, 718,800	B 2	Sant' Antico Island	B 5
Apennines (mts.)	C 3	Elba (island), 26,000	B 3	Milazzo, 20,454	E 5	San Vito, Cape	D 5
Apulia (department), 2,297,061	E 4	Emilia (department), 3,027,009	C 2	Minervino Murge, 19,323	E 4	Sardinia (department), 864,174	B 4
Aquila degli Abruzzi, 24,184	D 3	Emboli, 21,730	C 2	Modena, 83,663	C 2	Sassari, 42,946	B 4
Arezzo, 51,862	C 3	Etna, Mount (volcano)	E 6	Modica, 60,192	E 6	Savignano, 17,953	A 2
Argentiera, Cape	A 4	Eufemia, Gulf of	E 5	Mola di Bari, 15,701	F 4	Saviano, 58,711	B 2
Ariano di Puglia, 20,474	E 4	Fabiano, 25,209	D 3	Mondovi, 20,030	A 2	Schio, 15,521	C 2
Ascoli, 32,095	D 3	Faenza, 43,101	C 2	Monopoli, 25,219	F 4	Sciacca, 25,630	D 6
Asinara, Gulf of	B 4	Fano, 28,538	D 3	Monreale, 23,966	D 5	Semigallia, 25,327	D 3
Asinara Island	B 4	Fasano, 19,401	F 4	Monte San Giuliano, 31,148	D 5	Sessa Aurunca, 21,488	D 4
Assisi, 19,720	D 3	Favara, 21,379	D 6	Monte Sant' Angelo, 23,593	F 4	Sesto in Fiorentino, 21,073	C 3
Asti, 40,597	B 2	Feltre, 19,031	C 1	Naples, 772,405	D 4	Sestri Ponente, 23,417	B 2
Avellino, 25,595	E 4	Ferrara, 107,618	C 2	Nardo, 17,420	F 4	Sicily (department), 4,061,452	D 6
Avigliano, 19,463	F 4	Ferrato, Cape	B 5	Neapolitan Apennine (mts.)	E 4	Siena, 43,879	C 3
Avola, 20,137	E 6	Figari, Cape	B 4	Nicastro, 21,629	F 5	Sora, 17,612	D 4
Bagheria, 20,309	D 5	Filicudi Island	E 5	Noto, 32,366	E 6	Spartivento, Cape	B 5
Bagni San Giuliano, 20,943	B 3	Fiume, 46,063	E 2	Novara, 52,260	B 2	Spartivento, Cape	F 6
Barcellona, Pozzo di Gotto, 23,764	E 5	Florence, 253,565	C 3	Novi, 19,724	B 2	Spezia, 88,035	D 3
Bari delle Puglie, 114,754	F 4	Foggia, 67,314	E 4	Ombrone River	C 3	Spoleto, 28,289	D 3
Barletta, 51,205	F 4	Foligno, 32,777	D 3	Oristano, Gulf of	B 5	Squillace, Gulf of	F 5
Basilicata (department), 468,557	F 4	Forlì, 51,994	D 2	Orosi, Gulf of	B 4	Stromboli Island	E 5
Bassano, 19,959	C 2	Fossano, 18,484	A 2	Ortona, 16,779	E 3	Sulmona, 18,797	E 3
Benevento, 27,510	E 4	Francavilla Fontana, 23,637	F 4	Orvieto, 19,409	D 3	Syracuse, 49,622	E 6
Bergamo, 62,303	B 2	Frasca, Cape	B 5	Osimo, 19,811	D 3	Taranto, 103,807	F 4
Biella, 25,221	A 2	Fucino, Lake	D 3	Ostuni, 24,914	F 4	Taranto, Gulf of	F 4
Bisceglie, 38,391	F 4	Galluzzo, 19,342	C 3	Otranto, Strait of	G 4	Tempio Pausania, 16,781	B 4
Bologna, 211,157	C 2	Garda, Lake	C 2	Padua, 112,021	C 2	Tenda, Col de (pass)	A 2
Bolsena, Lake of	C 3	Gargano, Mount	E 4	Palermo, 393,612	D 5	Terano, 25,834	D 3
Bolzano, 25,315	C 1	Gennargentu, Mount del	B 4	Palermo, Gulf of	D 5	Termini Imerese, 18,639	D 5
Bonifacio, Strait of	B 4	Genoa, 316,217	B 2	Pantelleria Island	C 6	Terni, 36,324	D 3
Bra, 17,093	B 2	Genoa, Gulf of	B 2	Parma, 58,469	C 2	Terranova di Sicilia, 25,603	E 6
Brescia, 100,168	C 2	Giannutri Island	C 3	Partanna, 17,527	D 6	Teulada, Cape	B 5
Brindisi, 35,335	G 4	Giarme, 25,365	E 6	Partinico, 20,805	D 6	Tiber River	C 4
Bronte, 20,014	E 6	Giglio Island	C 3	Passero, Cape	E 6	Tivoli, 16,387	D 3
Budrio, 17,944	C 2	Gioia del Colle, 25,784	F 4	Paterno, 33,914	E 6	Torre del Greco, 45,641	D 4
Busto Arsizio, 27,568	B 2	Gioia, Gulf of	E 5	Pavia, 42,043	B 2	Tortona, 20,026	B 2
Cagliari, 61,758	B 5	Girgenti, 29,823	D 6	Pelagie Islands	D 7	Trani, 34,568	F 4
Cagliari, Gulf of	B 5	Gorgona Island	B 3	Pelagosa Island	F 3	Trapani, 71,174	D 5
Calabria (department), 1,512,318	F 5	Gorizia, 28,154	D 2	Pennine Alps (mts.)	A 2	Tremiti Islands	E 3
Calabrian Mountains	F 5	Granitola, Cape	D 6	Perugia, 72,971	D 3	Trent, 35,130	C 1
Caltanissetta, 60,086	E 6	Gravina in Puglia, 21,185	F 4	Pesaro, 29,899	D 3	Trentino (department)	C 1
Camajore, 20,102	C 3	Grossa or Lunga Island	E 2	Pescia, 17,932	C 3	Treviglio, 18,115	C 2
Campania (department), 3,254,440	E 4	Grosseto, 18,027	C 3	Pianosa Island	C 3	Treviso, 49,737	D 2
Campobasso, 16,330	E 4	Iglesias, 19,844	B 5	Piedmont (department), 3,383,646	A 2	Trieste, 238,655	E 2
Canosa di Puglia, 26,375	E 4	Imola, 37,293	C 2	Pietrasanta, 18,220	B 3	Trieste, Gulf of	D 2
Capraja Island	B 3	Ionian Sea	F 6	Pinerolo, 19,033	A 2	Tronto River	E 3
Caprara, Point	B 4	Ischia Island	D 4	Piombino, 23,622	C 3	Turin, 502,274	A 2
Caprera Island	B 4	Jesi, 25,949	D 3	Pisa, 68,933	C 3	Tuscany (department), 2,766,291	C 3
Carbonara, Cape	B 5	Lanciano, 20,396	E 3	Pistoia, 70,517	C 3	Tyrrhenian Sea	C 4
Carpi, 30,675	C 2	Leghorn, 114,809	B 3	Po, Mouths of the	D 2	Udine, 56,041	D 1
Carrara, 52,743	C 2	Legnano, 27,254	B 2	Pola, 49,323	D 2	Umbria (department), 638,991	D 3
Casale Montferrato, 34,253	B 2	Licata, 25,437	D 6	Policastro, Gulf of	E 5	Urbino, 19,932	D 3
Casalmaggiore, 14,909	B 2	Licosa, Point	E 4	Pollino, Mount	E 5	Ustica Island	D 5
Cascina, 27,266	C 3	Liguria (department), 1,335,466	B 2	Pontine Islands	D 4	Varese, 23,864	B 2
Caserta, 35,172	E 4	Ligurian Sea	B 3	Pontremoli, 15,022	C 2	Vaticano, Cape	E 5
Cassino, 18,757	E 4	Linaro, Cape	C 4	Ponza (island)	D 4	Velletri, 25,781	D 4
Castellammare del Golfo, 16,952	D 5	Linus, Mount	B 5	Pordenone, 19,972	D 2	Venezia (department), 3,999,027	D 2
Castellammare di Stabia, 39,188	E 4	Linosola Island	D 7	Porto Maggiore, 23,639	D 2	Venice, 171,655	D 2
Castellammare, Gulf of	D 5	Lipari Island	E 5	Potenza, 18,482	E 4	Venice, Gulf of	D 2
Castelvetrano, 23,737	D 5	Lipari Islands	E 5	Pula, Cape	B 5	Verona, 92,536	C 2
Castrogianni, 32,423	E 6	Lissa (island)	E 3	Ravenna, 71,877	D 2	Vesuvius, Mount	E 4
Catania, 252,448	E 6	Lodi, 29,395	B 2	Reggio di Calabria, 59,430	E 5	Vigevano, 27,618	B 3
Catanzaro, 36,138	F 5	Lombardy (department), 5,086,338	B 2	Reggio nell' Emilia, 82,915	C 2	Vigevano, 30,583	B 2
Cava de' Tirreni, 26,729	E 4	Lucca, 78,575	C 3	Reno River	D 2	Vittorio, 25,353	C 3
Cenis, Mount	A 2	Lucera, 17,593	E 4	Resina, 23,930	E 4	Vittorio, 31,997	E 6
Cento, 21,084	C 2	Lugo, 29,850	D 2	Rieti, 18,975	D 3	Vittorio, 24,400	D 1
Cerignola, 38,591	F 4	Lunga or Grossa Island	E 2	Rimini, 57,530	D 2	Voghera, 26,069	B 2
Cesena, 50,835	D 2	Macerata, 24,384	D 3	Rome (capital), 691,661	D 4	Volterra, 16,507	C 3
Cherso Island	E 2	Maddaloni, 22,661	E 4	Rome (province), 1,223,397	D 3	Vulcano Island	E 5
		Maggiore, Lake	B 2	Rossano, 16,021	F 5	Western Alps (mts.)	A 2
		Malta Channel	E 6				
		Manduria, 15,485	F 4				

to join in the coalition against France, and as a result, Napoleon invaded the peninsula and in a spirited campaign crushed all resistance and made of Italy a French dependency. The Treaty of Campo Formio in 1797 gave Venice to Austria—a cession of long-lasting importance; and from the rest of Italy created five republics, with Milan, Genoa, Rome, Bologna, and Naples as capitals. When Napoleon withdrew, the Italians rose in arms and drove out the French, but by a single battle, in 1800, Napoleon reasserted his sway, and later, when he made himself emperor, he rearranged the provinces as suited him, making of Naples a kingdom for his brother Joseph. Even Rome was taken over by Napoleon, while the Pope removed to France. Although lasting only until 1814, Napoleon's distribution of the territories of Italy had a lasting effect, for by blotting out old boundary lines, it made the people forget their old provincial divisions and awakened them to the fact that they were all Italians. Indeed, the desire for independence and nationality really was born during this period.

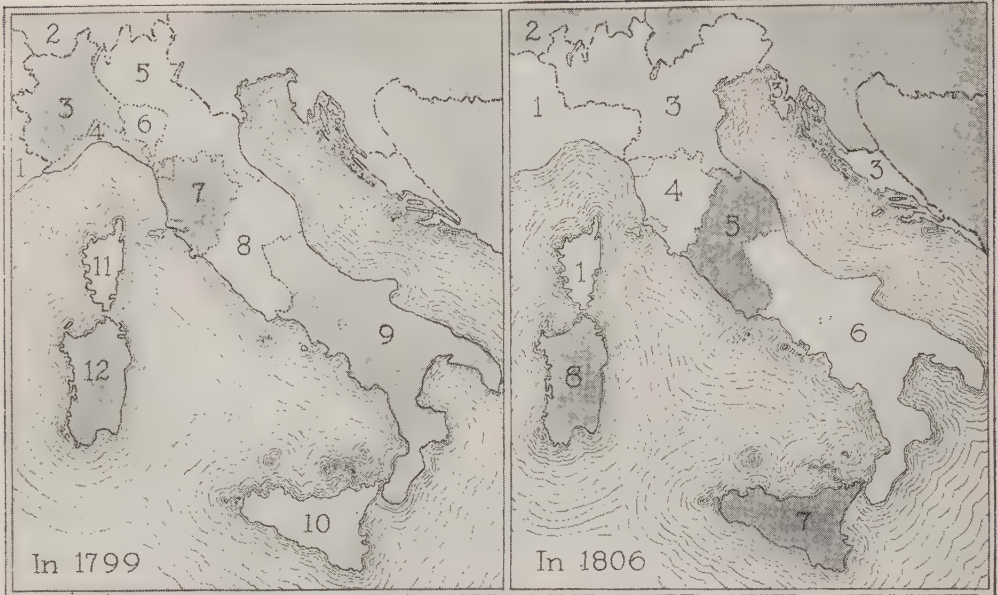
Early Stages of the Struggle. In 1815 came the Congress of Vienna, and its rulings left Italy just about where it had been before—largely in the hands of Austria and the Papacy. The House of Savoy, which had been driven out during the revolutionary times, received again its kingdom of Sardinia, the kingdom of the Two Sicilies went again to the Bourbon Ferdinand, and the Pope recovered all the states of the Church; but elsewhere Austria was all-powerful. All the growing wishes for unity and independence were crushed, as a result of the reactionary policy of Austria, and the various rulers proved themselves more tyrannical than ever before. Indeed, Austria instituted, politically speaking, a reign of terror, which had as its object the rooting out of liberalism. However, the desire had grown too strong to be suppressed. On every hand, secret societies came into being—societies with the most revolutionary purposes; and conspiracies against the foreign rule were rife in every part of the peninsula.

In 1831 there came to the throne of Sardinia a new king, Charles Albert, who proved more liberal than his predecessor, and his concessions caused the other states to look toward him as the possible head of a new, united Italy. The dominant spirit of the times was Mazzini (which see), head of the organization known as Young Italy, and his splendid eloquence roused the Italians to a half-maddened attitude of revolt. Then, in 1848, occurred a revolution in France, and at the same time a revolutionary wave swept over all of Western Europe. Italy felt it keenly, and all over the country insurrections took place. In Naples, in Rome, and in Venice, the rulers were forced to grant constitutional rights, and the Milanese

actually drove the Austrians from their city. The Sicilians threw off the Bourbon yoke, and Charles Albert of Sardinia went so far as to declare war on Austria. But the Austrians defeated him decisively at Novara in 1849, and at once the reactionary forces throughout the peninsula took heart and regained their supremacy. In Sardinia, however, the liberal spirit continued in the ascendancy, Victor Emmanuel II, who came to the throne on his father's abdication in 1849, upholding the policy of Italian freedom and rejecting all overtures from Austria. Not the least of his services to Italy was the choice of Cavour as Prime Minister. In any list of the creators of modern Italy, Cavour should, perhaps, be mentioned first, for without his farsightedness, his unselfishness, and his broad views, the achievement would not have been possible.

The Unification of Italy. Cavour's great ambition was to secure the aid of France in throwing off the yoke of Austria, and in this endeavor he was at last successful. Early in 1859 the French forces crossed the Alps, and the final struggle for a free Italy began. The great victories of Magenta and Solferino compelled Austria to give up Milan and Northern Lombardy, and then Cavour found to his chagrin that Napoleon III was prepared to go no further. He concluded with Austria the Peace of Villafranca, without even asking the assent of his Sardinian allies, violating his pledge that he would "free Italy from the Alps to the Adriatic." However, the tide had set in the direction of unity, and could not be turned back. Tuscany, Modena, Parma, and Romagna declared for annexation to Sardinia, but the rejoicing at this triumph was tempered by grief at the surrender of Nice and Savoy, the original home of the House of Savoy, to France as indemnity for its share in the war.

Then occurred that famous expedition under the most adored of all Italian heroes, Garibaldi. It resulted in the conquest of Sicily and Naples, and in November, 1860, the Kingdom of the Two Sicilies was annexed to the domain of Victor Emmanuel, who in the next year was proclaimed king of Italy. Venice and Rome were the only parts of the peninsula still to be gained, and the first of these came to Italy as reward for its aid to Prussia in the Seven Weeks' War with Austria. However, to be a really united kingdom, Italy must have its ancient capital of Rome, and in 1867 Garibaldi with his volunteers made an attempt to seize it, but was prevented by the French. Three years later, however, when the French troops were withdrawn from Rome because they were needed in the war against Prussia, Victor Emmanuel entered the city and made it the capital of his dominions. The Papal States became a part of the unified Italy, and the Pope was deprived of temporal power.



BEFORE NAPOLEON ORGANIZED ITALY

- | | |
|------------------------|----------------------------|
| (1) France | (7) Grand Duchy of Tuscany |
| (2) Switzerland | (8) Roman Republic |
| (3) Piedmont | (9) Parthenopean Republic |
| (4) Ligurian Republic | (10) Kingdom of Sicily |
| (5) Cisalpine Republic | (11) Corsica |
| (6) Duchy of Parma | (12) Sardinia |

WHEN NAPOLEON WAS KING OF ITALY AND JOSEPH BONAPARTE WAS KING OF NAPLES

- | | |
|------------------------|-------------------------|
| (1) France | (5) Papal States |
| (2) Switzerland | (6) Kingdom of Naples |
| (3) Kingdom of Italy | (7) Kingdom of Sicily |
| (4) Kingdom of Etruria | (8) Kingdom of Sardinia |

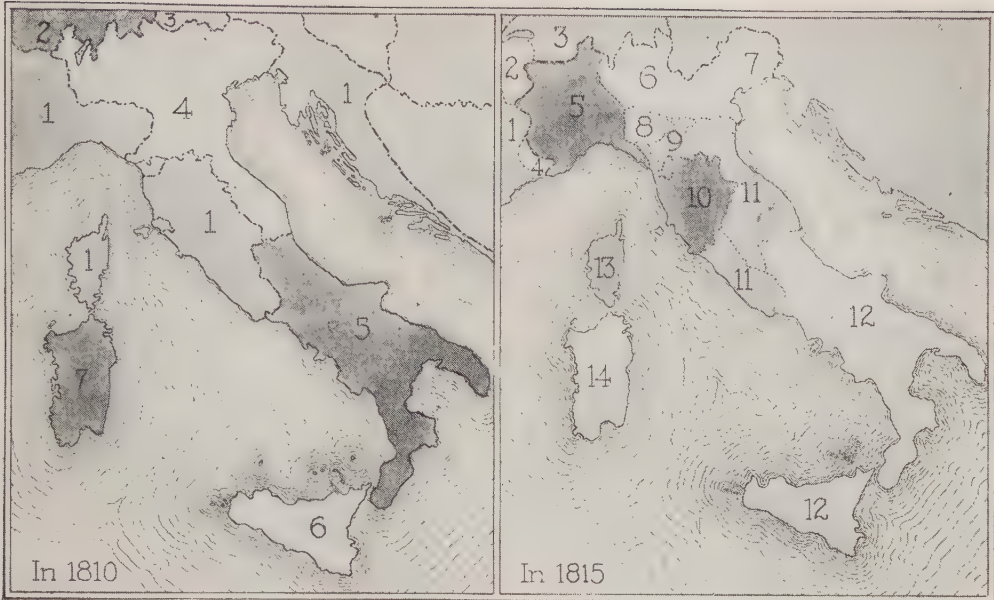
The Modern Kingdom. After the unification, Victor Emmanuel addressed himself to the task of preserving peace and organizing the new state, and that work was carried on by his successor, Humbert, who came to the throne in 1878. The much-loved Humbert was assassinated in 1900, and his son, the present king, came to the throne as Victor Emmanuel III. He proved himself a wise ruler, able to cope with the distressing political and economic problems which had grown out of Italy's centuries of political extinction. Attempts to establish a colonial policy and to give Italy a place among the great powers of Europe, however, entailed a heavy burden of taxation on the country.

On December 28, 1908, there took place an appalling disaster. An earthquake shook all of Southern Italy and a part of Sicily, destroying Messina, Reggio, and a number of smaller towns, and causing the death of more than 150,000 people. Southern and Eastern Italy also suffered severely for several years from a cholera epidemic.

In 1911 the peace policy of Italy was set aside, and war was declared on Turkey, the reason given being the desire to protect Italians in Tripoli. As a result of the brief conflict, Italy added Tripoli to its group of colonies, but allowed Turkey to keep a representative there as a concession to the Mohammedans.

Despite the Triple Alliance, which existed from 1882 and was several times renewed, Italy felt none too kindly toward Austria, while, on the other hand, its relations with France had grown more and more friendly. Doubtless this fact had much to do with the attitude of Italy when the great European war broke out in 1914.

Italy and the World War. For a year Italy kept out of the struggle, though it showed a decided leaning toward the Allies, but on May 24, 1915, it declared war on Austria-Hungary, identifying itself with the forces arrayed against the Central Powers. Subsequently, declarations of war were made against Bulgaria, Turkey, and Germany. Italy spent freely of its blood and treasure in months of fighting along the Austro-Italian frontier, and by keeping Austria's armies engaged there, it contributed materially to the allied cause. In the fall of 1917, however, after the collapse of Russia, German reinforcements and generalship brought about a terrible Italian defeat at Caporetto, a village in the northern part of Julian Venetia, on the Isonzo River. The Italians lost a thousand square miles of territory before they brought the enemy to a halt along the Piave River. With incredible exertions, the Italian army was reorganized, and a year later, under General Diaz, it overwhelmingly defeated the Austrians.



AT HEIGHT OF NAPOLEON'S POWER

- (1) French Empire
- (2) Switzerland
- (3) Bavaria
- (4) Kingdom of Italy
- (5) Kingdom of Naples
- (6) Kingdom of Sicily
- (7) Kingdom of Sardinia

- (9) Duchy of Modena; (10) Grand Duchy of Tuscany; (11) Papal States; (12) Kingdom of the Two Sicilies;
- (13) Corsica; (14) Sardinia.

DIVIDED BY THE CONGRESS OF VIENNA

- (1) France
- (2) Savoy (to France, 1860)
- (3) Switzerland
- (4) Nice (to France, 1860)
- (5) Piedmont
- (6) Lombardy
- (7) Venetia
- (8) Duchy of Parma

on the Asiago front. By opening the way into Germany, the Italians hastened the general Armistice, which came a week later, on November 11, 1918.

As partaker of the fruits of victory, Italy received the following territory in Europe: Venezia Tridentina, Gorizia and Gradisca and districts, Trieste, Istria, Zara and islands annexed from Dalmatia, and Fiume. Not until 1924 was there a final decision concerning Fiume and Dalmatia (see FIUME; RAPALLO, TREATY OF). Eventually, Italy gained nearly 9,000 square miles of territory formerly included in the old Austro-Hungarian Monarchy.

Italy under Fascism. The period of reconstruction following the close of the war was marked by political and industrial turmoil. High prices and widespread unemployment, difficulties in the assimilation of the returned soldiers, political strife and general discontent with Italy's treatment at the peace conference, all combined to bring about a condition favorable to the spread of radical propaganda. In 1920 strikes were called on the railroads, in the factories, and among the agrarian workers, manufacturing plants were seized, and revolutionary tribunals were set up according to the methods used by the Russian "Reds."

Political murders, too, were being organized, and Italy seemed on the verge of going over to the bolshevik form of government. Actually, the nation as a whole was not in sympathy with communistic schemes, but the government was too inefficient to maintain order. The revolts of the factory workers collapsed of their own weight when the rebels found that a factory could not be run without credit, organization, and experience.

In the meantime, in March, 1919, an ardent young ex-soldier, Benito Mussolini, had organized in Milan a band of nationalists who called themselves *Fascisti*, having adopted the fasces of ancient Rome as their symbol of obedience to law. A black shirt was chosen as the distinguishing mark of dress. These Fascists were equally exasperated by the tactics of the more violent communists and the ineptitude of the government, which was unable to check the disorders that were breaking down the social and economic fabric of the country. In 1920 the Fascists were meeting violence with violence. In 1921 they established themselves as a regular political party, and in 1922 had grown powerful enough to take control of the government. In October a general mobilization of Fascists all over the land was ordered,

and on Sunday morning of the thirtieth, the converging columns of Black Shirts entered Rome, which had been organized to receive them by Fascists already within the city. The king, Victor Emmanuel III, seeing the futility of declaring martial law, as urged by his advisers, sent for Mussolini, and the same day the latter became Premier of a new Cabinet. Once in control, he proceeded to consolidate his power.

Changes in Government. In the fall of 1927, the Fascists celebrated the fifth anniversary of their assumption of power. Within a period of five years they had changed Italy from a liberal Parliamentary democracy to a syndicalist, or corporative, state, in which only producers were given the privilege of participating in the political life. The kingdom of Italy, as such, had never had a constitution drawn up for its guidance, but had adopted and expanded that of Sardinia, which was the nucleus of the united nation. The form of government resembled that of England; that is, Italy was an hereditary monarchy governed by a king, a responsible Ministry, and a legislature of two houses—the Senate and Chamber of Deputies—corresponding, respectively, to the House of Lords and the House of Commons. Actually, however, the Italian system was less responsive to public opinion than the English. Universal male suffrage was not introduced until 1912. The Italian people had not experienced the discipline of years of real self-government when Mussolini came upon the scene, and he proceeded to abolish everything that savored of the old form of Parliamentary democracy.

By crushing opposition, by placing rigid restrictions upon the press, by the enactment of a series of laws radically reapportioning the powers of the various branches of the government, strengthening the executive at the expense of the legislative branch, he soon changed the whole character of the Italian government. The monarchy was retained, the prerogatives of the king being unchanged, and his prestige, if anything, enhanced. But the old Parliament, inherited from the preceding Liberal régime, was weakened. The Prime Minister no longer was responsible to the Parliament and removable at its will. Under the Fascist system, he was made responsible only to the king. Under the electoral law of 1924, the party receiving a majority of the votes at an election was arbitrarily given two-thirds of the seats in the Chamber, thus giving the ruling party secure control over the Parliament. The principle of centralization of administration was introduced into every branch of the Italian state.

But Mussolini regarded these early steps as merely the preliminary and transitional policies which should prepare the way for the ultimate

reorganization of the Italian state upon a syndicalist basis. Having consolidated his power and won the support of the great majority of the Italian people, he proceeded next to submit a plan for the reorganization of Parliament upon a radically different basis of representation. Holding that the old form of Parliament, based upon geographical representation of the people, by districts, was not truly representative of the actual economic interests of the nation, he submitted legislation in 1927 proposing that, in the new Parliament, representation should be given instead to occupational groups. In this new system, or corporative state, the Italian people should participate as producers, rather than as citizens.

A new electoral law, providing for the election of a new Parliament under this plan, was approved by both houses of Parliament and signed by the king, May 21, 1928. The main provisions of this law are as follows:

(1) Members of the new Corporative Parliament, which will be constituted in place of the present Italian Parliament, will be elected on a single list for the entire nation instead of, as formerly, by districts.

(2) It will be the purpose of the Fascist Grand Council to present a list of candidates to the voters which will be constituted of men representative of every economic and cultural group in the nation, rather than of men representative merely of local or geographical interests.

(3) Candidates for this list will be proposed in the first instance by the National Confederations of the syndicates legally recognized by the state. In addition, legally recognized non-political organizations, having national importance and whose aims are cultural and philanthropic, may also propose candidates, to the number of one-fourth the Deputies to be elected.

(4) The names of such regularly nominated candidates are submitted to the Grand Council of the Fascist party, which, after considering the qualifications and fitness of the nominees proposed, prepares a final list of official nominees of the Fascist party for the nation as a whole. This list is submitted to the voters for approval or rejection. If one-half of the votes cast, plus one, are favorable to the list, the Court of Appeals shall proclaim the election of all the Deputies designated therein.

(5) If the list of the designated Deputies is not approved, the Court of Appeals shall order new elections with competitive lists, within thirty to forty-five days from the date of the decree. In the new elections, all associations and organizations which contain 5,000 members who are regularly registered electors may present lists of candidates. The lists cannot include more than three-quarters of the Deputies to be elected. These competitive lists are then submitted to the voters, and those nominees receiving the highest votes are declared elected, in the order of the votes received.

(6) The right to vote is accorded to all Italian citizens over twenty-one years of age, or those under twenty-one and over eighteen, married and with offspring, provided they have fulfilled one of the following requirements:

OUTLINE AND QUESTIONS ON ITALY

Outline

I. Location and Size

- (1) Peninsular position
- (2) Water boundaries
- (3) Barrier of the Alps
- (4) Area and population

II. People and Cities

- (1) Racial qualities
- (2) Art, religion, education
- (3) Beautiful cities of Italy

III. Physical Features

- (1) Coastal peculiarities
- (2) Relief
 - (a) Mountain groups
 - (b) Lombardy plain
- (3) Rivers and lakes
- (4) Climate

IV. Industries and Commerce

- (1) The chief industry—agriculture
 - (a) Where practiced
 - (b) Chief crops
 - (c) System used

(2) Manufacturing

- (a) Artistic wares
- (b) Other products
- (c) Recent progress
- (d) Difficulties

(3) Mining

- (a) Sulphur
- (b) Other products

(4) Transportation and commerce

- (a) Railways
- (b) Imports and exports
- (c) Tourist trade

V. History

- (1) Early history that of Rome
- (2) The troubled medieval period
- (3) Invasion by foreign powers
- (4) Napoleonic period
- (5) The struggle for unification
- (6) Formation of the united kingdom
- (7) War with Turkey
- (8) World War
- (9) Italy under Fascism

Questions

What independent countries are entirely within the boundaries of Italy? Name them. Which one is the newer?

How has the geographic position of Italy favored its development?

What Pope first regarded himself as a prisoner in his palace, and why?

What were the city states? Name several of the most famous, and tell when they were at the height of their glory.

How did a great poet express his undying love for Italy?

What Italian educator has become famous the world over, and why?

What North American region is in the same latitude as Italy?

What is the "backbone" of Italy? What is its "football"?

Why does "Look well to the mother before wedding the daughter" have special force in Italy?

Why, with a comparatively heavy rainfall, does Italy need to resort to irrigation almost everywhere?

When and why did a breaking up of boundary lines and a redistribution of territory work toward unification?

Why have Italians emigrated in large numbers?

Why has not Rome always been the capital of United Italy?

What king, what soldier, and what statesman had most to do with the unification of Italy?

To what extent were Italy's boundaries changed by the World War?

What changes in government were effected by the Fascist revolution?

Explain the term "Black Shirt."

What and where is the Vatican City?

What were the relations of Napoleon Bonaparte to Italy?

- (a) That they pay dues in a syndicate of their occupation, or else hold membership in a society which itself pays syndicate dues.
- (b) Or that they pay at least 100 lire annually of direct taxes, or have been for at least a year holders of bonds of the public debt of the state, or shareholders of provincial or municipal loans for an income of at least 300 lire.
- (c) Or that they receive a salary or pension from the state, province, municipalities, or some other organization under the administration of the state.
- (d) Or that they be members of the Catholic clergy, or ministers of a religious body recognized by the state.
- (7) The number of Deputies in the Parliament shall be 400.

From this summary, it will be seen that the new electoral law provides in the first instance for a plebiscite on the approval or rejection *en bloc* of the Fascist party. If the plebiscite rejects the Fascist list, the vote will be interpreted as a rejection of the party; in such case, elections on a competitive basis will be restored.

In addition to making these sweeping changes in the form of the central government, a corresponding change was made in the administration of the municipalities of Italy. In the more than 9,000 communes of Italy, with the single exceptions of Rome and Naples, the former system of electing municipal officials was abolished, and in its place it was provided that an official, known as *podesta*, whose powers correspond strikingly to those of the city manager in many American municipalities, should be appointed by the central government, for a term of office of five years. The *podesta* is not responsible to the voters of the city which he governs, but directly to the central government. However, he is assisted in the administration of his commune by an advisory body of representatives chosen by the corporations, or guild organizations, of the commune.

In Rome the old form of city government was replaced by a system of administration by a governor, appointed directly by the central government. In Naples the executive is similarly appointed and bears the name of royal commissioner. Certain supplementary regulations were made for communes of over 20,000 population, and for capital cities.

[The policy of the Fascists toward the Papacy, and its development in the pact of 1929, referred to earlier in this article, are treated at length in the articles MUSSOLINI, BENITO; PAPAL STATES; and VATICAN CITY.]

Foreign Policies. Mussolini's aggressive foreign policies are evidence of his desire to see Italy expand into a powerful empire, supreme in the region of the Adriatic. He incurred the displeasure of France by concluding a treaty of defensive alliance with Albania, in 1927, and he is credited with having had a part in the

change of government in Albania, in 1928, by which Ahmed Zogu, President, assumed the title "Scanderbeg III, King of the Albanians," better known as Zogu I.

In 1929 the Roman Catholic Church and the kingdom of Italy reached an agreement on the political independence of the Vatican; the state of Vatican City was established, giving the Pope temporal power. . . . H.L.V.

Related Subjects. For supplementary information on Italy, the reader is referred to the following articles:

CITIES	
Fiume	Naples
Florence	Pompeii
Genoa	Rome
Herculaneum	Turin
Milan	Venice
DIVISIONS	
Etruria	Piedmont
Latium	Sardinia, Kingdom of
Lombardy	Sicilies, Kingdom of
Monaco	the Two
Papal States	Tuscany
ISLANDS	
See list, under article ISLAND.	
LEADING PRODUCTS	
Grape	Rayon
Marble	Silk
Macaroni	Sulphur
Olive	Wine
MOUNTAINS	
Alban Mountains	Matterhorn
Alps	Mont Blanc
Apennines	Vesuvius
Etna	
WATERS	
Adige	Po
Arno	Rubicon
Como (lake)	Tiber
Maggiore (lake)	
HISTORY	
Albania	Humbert I
Austria-Hungary	Mazzini, Giuseppe
Bonaparte, Napoleon	Medici
Byzantine Empire	Mussolini, Benito
Cavour, Count Camillo	Papal States
Charlemagne	Pope
City States	Rome (History)
Crown (Iron Crown)	Triple Alliance
Fascism and the	Victor Emmanuel
Fascisti	(II, III)
Garibaldi, Giuseppe	World War
Guelphs and Ghibellines	Young Italy
Holy Roman Empire	Vatican City

ITASCA, *i tas' kah*. LAKE. See MISSISSIPPI RIVER.

ITATIAYA, MOUNT. See BRAZIL (Highlands and Lowlands).

ITCH. The word *itch* is so descriptive as to need no definition. Specialists hold that itching comes from pressure on the end nerves of the skin, and results when the end nerves are caught between thick layers of skin on the outside and dilated skin capillaries on the other. It may be due to a mere nervous influence and have no significance whatsoever, and it may come from general systemic disease,

as liver or kidney trouble. The use of certain narcotic drugs, as morphine, causes intense and persistent itching of the nose, probably of reflex nervous origin. It may be purely mental in origin, as the itching sensation perhaps produced by reading this article. Itching may also be caused by fungous growths or actual minute insects, and in such cases it is a symptom of certain forms of *itch*.

Barber's Itch, ringworm of the beard, is caused by a fungous growth in the hair follicles and in the tissues below the skin on the face and neck. It is usually acquired in the barber shops through the medium of unclean instruments, but may be contracted from animals. Barber's itch takes the form of an eruption characterized by pus-filled pimples and lumps, causing severe itching and smarting. Treatment should be in the hands of a physician. Cleanliness, use of ointment, and X-ray treatments are the remedies now employed. It is important, too, for the general health to be built up.

Scabies, the most common form of itch, is caused by the itch mite. This parasite burrows into the skin and poisons it, causing the formation of pimples, blisters, and boils. These formations are aggravated by scratching, and are often covered with bloody crusts. The disease is very persistent and contagious, but may be cured if treatment is thorough and constant. Sulphur ointment or other preparation prescribed by the physician, scrupulous cleanliness, and disinfection of bedding and clothing are essential. A person afflicted with scabies should exercise every possible sanitary precaution, in order to protect others. See MANGE.

W.A.E.

ITHACA, the legendary birthplace of Ulysses. See IONIAN ISLANDS.

ITHACA, N. Y. See NEW YORK (back of map).

ITO, *e' toh*, HIROBUMI, Marquis (1841-1909), a Japanese statesman whose efforts to modernize the government of his country won him the name "Father of the Constitution." At the age of twenty, he defied the law forbidding a citizen to leave Japan, and made his way secretly to England, where he remained for two years in study. In 1864 the hostile attitude of the Japanese ruler toward the treaty powers—the United States, England, Holland, and France—caused Ito to return home, and though he could not prevent an outbreak of fighting, he gave good service in the peace negotiations. Thereafter, he worked openly to bring about a reorganization of the Japanese political and economic systems. His study of the American coinage system, in 1871, led to the adoption of a Japanese monetary system based on the decimal plan, and in 1885 he saw the Cabinet reorganized in conformity with European ideas. Ito became Premier in 1886, and in

1889 he witnessed the long-desired fulfillment of his dream for a new Constitution [see JAPAN (Government)].

Ito directed Japan's foreign affairs during the war with China in 1894, and soon after the outbreak of the Russo-Japanese War, went to Korea (now Chosen) as special adviser to the emperor. Later, he was stationed there as resident-general, and as such was practical ruler of the country. During the discharge of his duties, he was assassinated by a Korean at Harbin. See JAPAN (History).

ITURBIDE, *ee toor be' thay*, AGUSTIN DE (1783-1824), a Mexican revolutionist who afterward became emperor. He was noted as the originator of the "Plan of Iguala," by which he proposed to establish the independence of Mexico under a Spanish Bourbon prince. Iturbide was born at Valladolid, Spain, but early in life went to Mexico, then a Spanish possession. In 1810 he served as lieutenant in a local regiment, but in 1820, on the outbreak of an insurrection, he joined the royalist forces and displayed such valor and ability that he was promoted to the command of the northern army. The "Plan of Iguala" aroused much opposition, which Iturbide quickly overcame, and in 1822 he was proclaimed emperor of Mexico under the name of Agustín I. The Mexican Congress declared the throne hereditary in his family, and voted him a yearly allowance of \$1,500,000. In less than a year, however, the country was torn by civil strife and insurrection, and in 1823 Iturbide was forced to abdicate. He was allowed to retire to Europe with a generous pension, on condition that he should not return. A year later he attempted to reënter Mexico, hoping to recover his crown, but was arrested and shot. See MEXICO (History: Freedom).



PHOTO: DEWITT ALLEN

ITURBIDE

IVAN, *ee vahn'*, the Russian word for *John*, is the name of several rulers distinguished in the history of Russia, the most noted being the emperors Ivan III and Ivan IV.

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Ivan III, the Great (1440-1505), was the real founder of the Russian Empire. His reign saw the beginning of expansion and of important diplomatic relations with Western Europe, resulting in a strengthening of the idea of national unity. He conquered Novgorod in 1477, increased the power of Moscow, assumed the title of emperor, and after his

marriage to Sophia, niece of the Byzantine emperor, added the double eagle to the Russian coat of arms.

Ivan IV, the Terrible (1530-1584), the first ruler to assume the title of czar, was crowned in 1547. His reign was a continual struggle with the privileged members of the aristocracy, who had controlled the



IVAN THE TERRIBLE

government during his youth. Under the guidance of his "chosen council" and the *Sobor*, or National Assembly, a new code of laws was formed which radically reformed and improved local self-government and administration. He invited learned men and artists to Russia, established commercial relations with England, and toward the end of his reign conquered Siberia. Nevertheless, the name *Terrible* was well earned, for in war and when dealing with insurrections, Ivan was extremely cruel. See **RUSSIA** (History).

IVAN OF RUSSIA, half-brother of Peter I. See **PETER I.**

IVORY, the substance of which the tusks of elephants are composed. Ivory is characterized by a beautiful white color, delicate translucency, perfect elasticity, hardness of texture, and capability of receiving a high polish. Moreover, it is a substance which can be readily used for the most delicate work which the carver's or sculptor's art can produce.

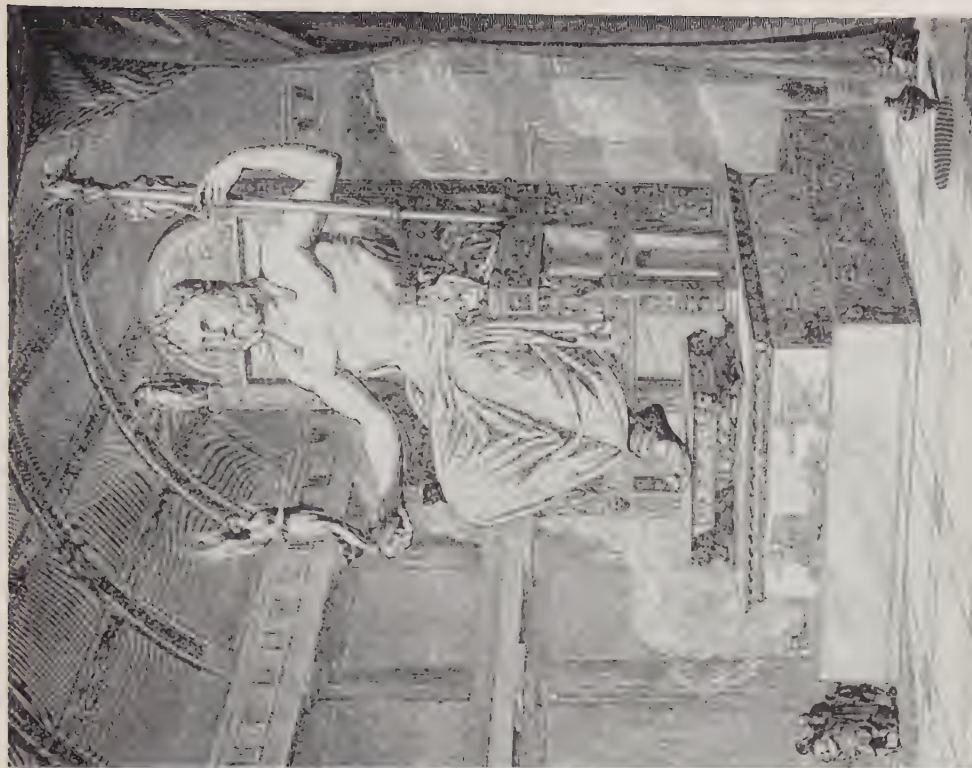
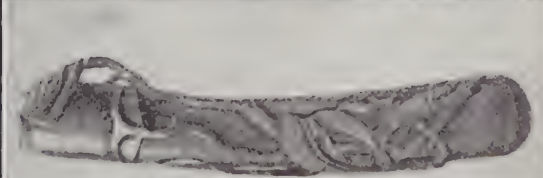
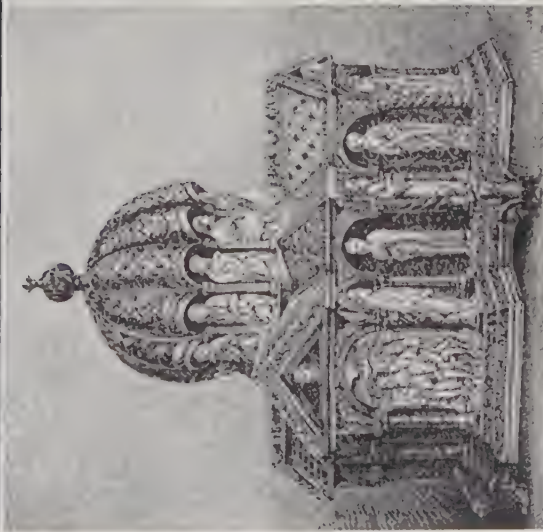
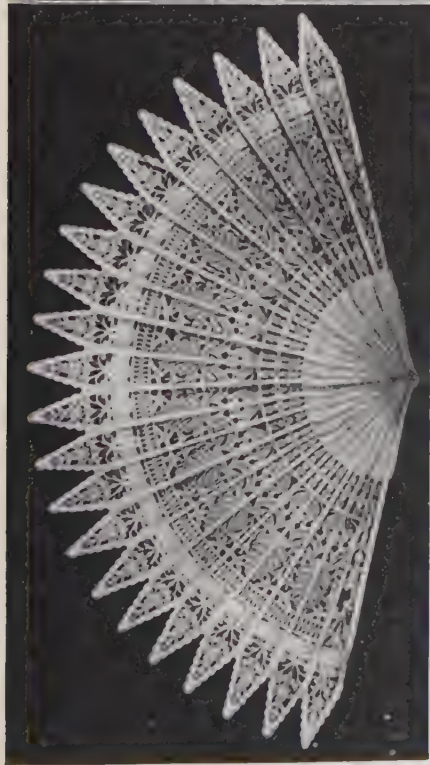
Sources of Supply. The best ivory comes from equatorial Africa. The tusks of a male elephant are larger than those of the female; they vary in length from about eight feet upward and weigh from about fifty to 150 pounds each; but sometimes specimens are found which greatly exceed these dimensions. The tusks of the Indian elephant are much smaller. Great quantities of ivory come from

Siberia. These are the fossil remains of the tusks of the mammoth and the mastodon, great animals that existed in prehistoric times (see **MAMMOTH**; **MASTODON**). The tusks of these animals have been hidden and preserved in the frozen ground for thousands of years, and are now being extracted in some such way as coal is taken from a coal mine. This is known as dead ivory, and it is not of such good quality as the ivory of present-day elephants; however, some of these buried tusks are remarkably well preserved, and may be regarded as valuable sources of supply, for live ivory is constantly becoming scarcer. The chief markets for the sale of ivory are London, Antwerp, and Liverpool.

Its Uses. To-day, ivory is used for the manufacture of a great number of articles, and it has in consequence a high commercial value. Billiard balls, piano keys, chessmen, knife and cutlery handles, combs, toilet devices, and ornamental articles of various kinds are among the objects made from ivory. The highest quality of ivory is used in the manufacture of billiard balls. Nothing is wasted of this valuable material, and every particle that remains after the tusk has passed through various processes of manufacture, such as the shavings and dust, is saved. This is converted, by burning, into a black powder called *ivory black*, or into artists' pigments.

In commerce, the tusks, horns, and teeth of the hippopotamus, walrus, and narwhal are sold as ivory, and there are certain imitations on the market. The most important natural source of imitation ivory is the kernel of a palm nut (see **IVORY PALM**). Celluloid and similar materials are made in imitation of ivory by dissolving cotton or other form of cellulose in an acid (see **CELLULOSE**). Milk curd, compressed and chemically treated, is also used as imitation ivory.

Ivory Carving. There are in the Old Testament many references to the beauty and value of ivory. It is interesting to note that the earliest specimens of human art are carvings of ivory. Thus, remarkably beautiful carvings on bones and ivory were found among the objects discovered in the prehistoric caves of Dordogne, in the south of France. Similar objects have been discovered among the remains left by the ancient lake dwellers in Switzerland. These are the earliest dwellings which prehistoric men built for themselves, so far as we know. The men who produced these works lived in an age when the mammoth and the reindeer were still roving over Southern Europe. In the tombs of ancient Egypt, many exquisitely fine ivory carvings, such as boxes, trinkets, statuettes, and the like, have been found. Among the objects brought to light in the excavations of the ancient cities of Assyria and Babylonia were many works in ivory.



Some Remarkable Carving in Ivory. Upper left, French fan. Below, a small shrine, eleventh century; figures in walrus ivory (now in museum of South Kensington, London). Center, Japanese ivory carving. At right, statue of Olympian Zeus (Jupiter), in carved ivory; this was the largest ivory carving in the world. The illustration is from a restoration.



Photo: Keystone

THE IVORY DOCK IN LONDON

One consignment of tusks from Ethiopia (Abyssinia), and, in the foreground, a few tusks of prehistoric mammoths, recently excavated in Russia. The latter are supposed to be two million years old.

Specimens of these various objects can be seen in the great museums of the world.

Ivory as a Material in Fine Arts. Ivory was an important material used by the sculptors of Greece. Many Greek sculptures had the body made of wood, and the face, hands, and other exposed portions of the statue were covered with thin layers of ivory, while the drapery, as well as the hair, was worked in gold. The gigantic statue of Zeus in Olympia, and the statue of the goddess Athena in the Parthenon at Athens, were celebrated examples of such sculptures. These statues were the masterpieces of Phidias.

India has always been and still remains the classic home of the art of ivory carving, while both the Chinese and Japanese are renowned for their fine ivory work, executed with great skill, patience, and care.

IVORY, VEGETABLE. See **IVORY PALM**.

IVORY BLACK, a term sometimes used for powdered bone. See **BONEBLACK**.

IVORY COAST, a colony of French West Africa on the north coast of the Gulf of Guinea, between Liberia and the British Gold Coast Colony. It has a coast line of 380 miles, an

area of about 122,000 square miles, and a population of over 1,500,000, including only 1,200 white people. The French asserted their right to the district about 1843, but the colony was not organized until 1893. The principal centers of trade and population are Grand Bassam, which has a fine harbor, Assinie, Sassandra, and Bingerville (the capital, white population, 100). These are all on or very near the coast. The towns of Kong and Sakala are in the interior. Coco-

nuts and rubber are collected, and the natives cultivate bananas, pineapples, coffee, and maize. The mahogany forests are worked, and gold is found on the Comœ and Bia rivers.

The colony's ports are visited by the steamers of French and British lines. There are a



LOCATION MAP

The Ivory Coast is represented by the nearly square black area on the Atlantic Coast.

number of public and Roman Catholic private schools, and telegraph and telephone lines connect the principal towns.

IVORY PALM, a handsome South American tree whose nuts have become an important article of commerce. They have been used extensively in the manufacture of ivory buttons, as well as chessmen and small ornaments. The tree, properly known as the *tagua palm* among the natives who gather the nuts, grows very slowly to a height of twenty to forty feet, with large, gorgeous leaves shooting out from the thick central stalk like graceful, green ostrich plumes. Fragrant white blossoms grow at the base of the lowest leaves, where later a large, rough, brown bur appears. Within the bur sixty to ninety nuts, the size of walnuts, are incased until they ripen, when the lower part of the bur splits open, letting the *negritos*, as they are often called, fall to the ground. The kernel of the nut, when ripe, is soft, juicy, and edible, but after being dried it becomes a very hard, white composition which looks so much like ivory that it is called *vegetable ivory*.

The trees, which live to be seventy-five to 100 years old, begin bearing nuts in their sixth year. As the texture of vegetable ivory is such that it readily absorbs dyes and also takes on a high permanent polish, the nuts are shipped in great quantities for making buttons. See **BUTTON**, for illustration. G.M.S.

Scientific Name. The ivory palm belongs to the family *Phoenicaceae*. Its botanical name is *Phyletaphas macrocarpa*.

IVRY, *eev re'*, **BATTLE OF**. See **HENRY (IV, France)**.

IVY. As commonly used, this name belongs to no special plant, but is applied to a large number of creeping or climbing vines of different botanical classification. The more important of the plants known as ivy are the following:

Common, or English, Ivy. This is the plant that climbs so picturesquely over walls and tree trunks in England. Its five-angled, waxy, dark-green leaves turn bright scarlet in the fall, and it bears small, inconspicuous flowers. Fine air roots enable the stems of this ivy to cling even to smooth surfaces. It does not endure well the bright sun of American winters, but in suitable locations can be grown as far north as Ontario, and is an excellent covering for buildings. The lines below, descriptive of this ivy, are from a poem in Dickens' *Pickwick Papers*:

O, a dainty plant is the ivy green,
That creepeth o'er ruins old!
Of right choice food are his meals, I ween,
In his cell so lone and cold.

Creeping where no life is seen,
A rare old plant is the ivy green.

Scientific Name. The English ivy belongs to the ginseng family, *Araliaceae*. Its botanical name is *Hedera helix*.

Boston, or Japanese, Ivy. This is the climbing vine one sees frequently in New England and other parts of the Eastern United



IVY

(a) English ivy, valued for window decoration; (b) Boston ivy.

States, where it covers the shady sides of buildings with a lovely green carpet. It has three-lobed leaves. This plant belongs to the same genus as the Virginia creeper, described elsewhere in these volumes under that title.

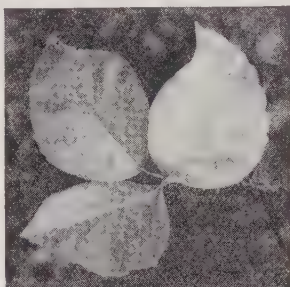
Scientific Name. The Boston ivy belongs to the vine family, *Vitaceae*. Its botanical name is *Ampelopsis tricuspidata*.

Ground Ivy. The ground ivy, also called *gill-over-the-ground*, is a trailing plant whose creeping stems form dense masses wherever they get a foothold. Though formerly used in making ale and cough medicine, and favored by some landscape gardeners, the ground ivy is usually considered a troublesome weed in North America, to which it was brought from Europe. It has rounded kidney-shaped leaves and purple or blue tube-shaped flowers.

Scientific Name. The ground ivy belongs to the mint family, *Menthaceae*. Its botanical name is *Nepeta glecoma*.

Poison Ivy. This is a widely distributed shrub or woody vine of North America that everyone should be able to recognize. Contact with poison ivy by susceptible persons causes itching of the skin, which is followed by inflammation and painful blisters. Wash

ing affected parts with laundry soap and water is the most efficacious remedy. No chemical should be applied except as prescribed by a physician. Poison ivy often grows in the same locality as the harmless Virginia creeper, and the two are likely to be confused (see VIRGINIA CREEPER). The latter however, has leaves composed of five leaflets, while those of poison ivy are made up of three. One can remember the distinction by recalling the letter *V*, which stands for *five* and is the first letter of Virginia. Both plants are partial to rich, moist soil in open woodlands, and also are found along bushy



Photos: St. Clair

POISON IVY

Above, a leaf cluster, showing how the leaves grow; a help in identifying and avoiding this dangerous plant. Below, a view of the blossoms.

fence rows. The ivy is either a slender shrub from one to five feet high, or a climbing vine attached to trees by numerous aerial roots. The Virginia creeper climbs by tendrils, not roots. The poison ivy has glossy dark-green leaves, small greenish flowers and white, waxy berries. The latter furnish food for the birds until late in winter. In the fall the leaves are beautifully colored and very attractive, but beware of gathering them!

B.M.D.

Scientific Names. Common poison ivy belongs to the cashew family, *Anacardiaceae*, and to the sumac genus, *Rhus*. Its botanical name is *R. toxicodendron*. A California species is *R. diversiloba*.

IVY, FIVE-LEAVED. See VIRGINIA CREEPER.

IZAAK WALTON LEAGUE, an international organization of sportsmen and sportswomen, in the United States and Canada, whose object is the preservation and restoration of America's recreational areas and the perpetuation of sports of field and stream. See WALTON, IZAAK.

The League was organized in 1922, in Chicago, and it now has over 3,000 local chapters. Its platform is briefly summarized below:

1. The practice of true sportsmanship in hunting and fishing, and strenuous and unrelenting opposition to illegal, destructive, and unfair methods.
2. An aggressive program calling for national and state legislation to eradicate pollution from coastal and inland waters.
3. The broadest and most comprehensive system of Federal control feasible over our forests, to embrace the best features of the forestry policies of Europe, so far as applicable to our traditions.
4. Constructive opposition to artificial drainage which will be injurious to any natural resources, and the restoration of desecrated areas.
5. That adequate public shooting and fishing grounds and game refuges be established by the state and national governments.
6. Sufficient fish hatcheries and game farms for the increased propagation and wider distribution of fish and game.
7. Prohibition of the sale and interstate shipment of game and of fresh-water game fishes, excepting for purposes of propagation.
8. Scientific regulation of the taking of salt-water game fishes, and prohibition of the sale of certain anadromous species (those that ascend rivers from the sea).
9. The strictest enforcement of the migratory bird law.
10. The establishment of biological experiment stations to train scientific workers so that all game and fish propagation and distribution may be safeguarded by expert supervision and counsel.
11. The united support of those public officials, regardless of their party affiliations, who show themselves to be in sympathy with the principles of true conservation.
12. The fullest measure of coöperation between all organizations devoted to the interests of the outdoorsmen of America.
13. An unceasing, aggressive educational campaign to the end that the objects of the Izaak Walton League of America may be attained.
14. That outdoor recreation as a major part of the life, education, and spiritual development of the American youth be nurtured.

IZTACCIHUATL, *ees tahk se' hwah't'l*. See MEXICO (Its Surface).

IZZARD. See the article Z.

THE WORLD BOOK

MODERN

ENCYCLOPEDIA

PICTORIAL

COMPREHENSIVE

J j

J is the tenth letter in the English alphabet. Like the letter *i*, it was derived from the Phoenician *yod*, which it resembles more closely than does *i*, because *yod* was also a consonant. In early English no distinction was made between *i* and *j*, and even after two forms existed for the two letters, there seemed to be no distinction in their usage; but little by little the *j* came to be used exclusively as a consonant. The

sound value of *j* is not what it was with the Romans, theirs being rather the sound of the English *y*, which is retained in the word *hallelujah*. Other languages which were derived from the Latin have also changed the sound of this letter, the French and Portuguese giving it a sound which resembles that of English *zh*, and the Spanish making of it an aspirate, like English *h*. Spanish names of places, as San José, San Juan, have made people familiar with this use of the letter *j*.

JABIRU, *jab' ih roo*, the only true stork found in North America. It is common in the tropics, and occasionally is seen as far north as Texas. The jabiru is a very large bird, about four feet long and seven feet across the wings, and possesses a huge bill which is extremely thick at the base, a foot long, and curved upward at the tip. Its plumage is pure white, while the bill and legs, as well as the head and neck, which are destitute of feathers, are all black, except for a reddish ring consisting of two folds of skin around the lower part of the neck. This ring can be distended to form a pouch when the bird is angry or excited. Jabirus feed on frogs, fishes, and other water animals.

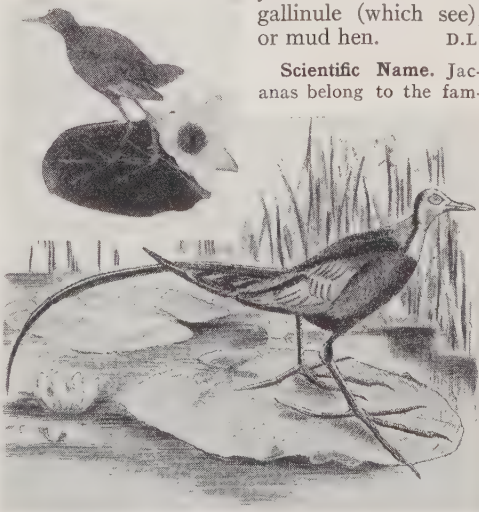
There are other species of jabiru in Australia, Asia, and Africa. See STORK. D.L.

Scientific Name. The North American jabiru is *Mycteria americana*. It belongs to the family Ciconiidae.

JACANA, *jak' a nah*, a small wading bird related to the plovers (which see). It is remarkable for its long toes and nails, which enable it to run easily over the floating leaves of large aquatic plants, in search of food. The various species are distributed generally over tropical regions. An Oriental species, called the *surgeon bird*, has a long tail resembling that of a pheasant. It is brownish above and purplish below, and has a white head and wings. Native artists, from India to Japan, delight to paint this jacana. A typical American species, found in the tropics and as far north as Texas, has purplish-chestnut plumage, and

is equipped with strong spurs, one in the bend of each wing. These are useful fighting weapons. In general appearance and habits, the jacana resembles the gallinule (which see), or mud hen. D.L.

Scientific Name. Jacanas belong to the fam-



THE JACANA

ily *Jacanidae*. The scientific name of the North American (Mexican) species is *Jacana spinosa*.

JACKAL, *jak' awl*, a kind of wild dog inhabiting Asia, Africa, and Southeastern Europe. The Arabs call the animal the "howler," because of the dismal cries it utters during the night. In appearance the common jackal resembles a fox, with grayish-yellow fur and

bushy tail. It is seldom more than fifteen inches high, from shoulder to ground. The animals hunt in packs, usually at night. Be-



The jackals' troop, in gather'd cry,
Bay'd from afar complaining,
With a mix'd and mournful sound,
Like crying babe, and beaten hound.

—BYRON: *Siege of Corinth*.

cause it is not above feeding on carrion, the erroneous notion once prevailed that the jackal helped the lion to track down prey, satisfying itself afterward with the remnants of the feast. It is timid, and is easily domesticated. The *black-backed jackal*, an African species, is prized for its fur, which is more attractively colored than that of the common variety.

M.J.H.

Scientific Names. Jackals belong to the family *Canidae*. The common jackal is *Canis aureus*; the black-backed is *C. mesomelas*.

JACKBOOT. See **BOOTS AND SHOES**.

JACK CADE'S REBELLION. See **HENRY (VI, England)**.

JACKDAW, a common European bird of the crow family. It is deep black in color,



JACKDAWS

with a grayish fringe around the neck, and is usually about fourteen inches in length. The jackdaw is a very sociable bird and frequents towns and villages, building its nest in spires

and holes in trees. Jackdaws make intelligent pets, but are mischievous, like the crow, and will steal any small, bright object that attracts their attention. One of the best known of the Ingoldsby legends is a story of a jackdaw who stole a cardinal's ring and was cursed until he restored it. See **CROW**. D.L.

Scientific Name. The jackdaw belongs to the family *Corvidae*. It is classed as *Corvus monedula*.

JACKET, the outer tube of a gun. See **ARTILLERY (How Big Guns Are Made)**.

JACK FROST. See **FROST**.

JACK-IN-THE-PULPIT, OR **INDIAN TURNIP**, a quaint American wild flower of the moist woodlands and thickets, found growing from Nova Scotia southward to the Gulf states and as far west as Minnesota. It belongs to the arum family and is related to the marsh calla (see **CALLA**). Jack-in-the-pulpit has been well named. The tiny greenish-yellow flowers of this plant are clustered on the lower part of a smooth, slender stalk, called the *spadix*, which is enveloped by a curving, leaflike *spathe* whose broad, overhanging flap is the sounding board of the "pulpit."



Jack-in-the-Pulpit
Preaches to-day,
Under the green trees
Just over the way.

Green is his surplice,
Green are his bands;
In his queer little pulpit
The little priest stands.

Green fingers playing
Unseen on wind-lyres—
Low singing bird voices—
These are his choirs.

—WHITTIER.

The odd-shaped plant may be seen in blossom from April to June; the flowers are followed by clusters of smooth, red berries, which the Indians at one time used to boil for food. The plant grows from a turnip-like root filled with a fiery juice, sometimes used in concocting domestic cough medicine. The root, though tasteless when boiled, contains considerable nutriment.

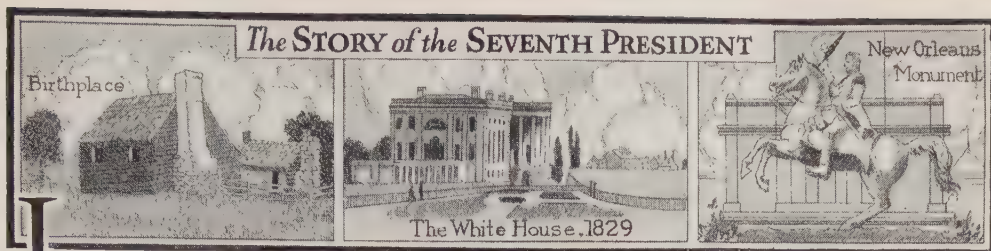
B.M.D.

Scientific Name. The plant belongs to the family *Araceae*. Its botanical name is *Arisaema triphyllum*.

JACK RABBIT. See **HARE**.

JACK SALMON. See **PERCH**.

JACKSCREW. See **SCREW**.



JACKSON, ANDREW (1767-1845), an American soldier and statesman, President of the United States from 1829 to 1837, the seventh man to hold that office. In an age which produced Clay, Webster, Calhoun, and other great men, Jackson was perhaps the most striking character of his day. He was a lawyer by profession, a fighter by preference, and a politician through circumstance. He was violent and quick in temper, and loved a fight for its own sake.

He was constantly involved in quarrels, and nearly always was firmly convinced of the correctness of his own opinions. Yet he was not arrogant or egotistical, and could be easily influenced by those who understood him. As a boy he had practically no schooling, and had been allowed to run wild; yet as a man he had dignity and courteous manners, and he could express himself in a vigorous style. He was in many ways typical of the times and of the section he represented. He was a frontiersman and not, like his predecessors in the Presidency, an aristocrat trained to govern. His election was significant because it was visible evidence that a new spirit was working in the United States. Jackson was the first President who belonged to the "common people."

A character as strong as Jackson's was bound to leave a deep impress on American history, and there is good reason for calling his two terms the "reign of Andrew Jackson." He entered office practically without fixed political opinions, yet almost every important event of his administration bears the stamp of his personal influence. With the exception of Van Buren, the members of his Cabinet were little more than a committee to carry out his orders. On the other hand, Jackson often accepted advice from his intimate friends, some of whom were dubbed Jackson's "Kitchen Cabinet," and some of the measures which are most closely associated with his name were really the work of others. Such, for example, was the introduction of the spoils system, which was chiefly the work of Van Buren. It has been said of Jackson that he was not a great President, but that he was a great party President. With Thomas Jefferson, Jackson is considered the creator of the present-day Democratic party; if Jefferson may be said to have drawn the plan for the structure, Jackson erected it.

His Youth and Early Manhood. Andrew Jackson was born on March 15, 1767. The place of his birth is uncertain, the honor being claimed both by North Carolina and by South Carolina. Jackson himself always believed that he was born near Waxhaw Creek, in Lancaster County, S. C., and most of his biographers agree with him. His father, also named Andrew Jackson, was a poor farm laborer, of Scotch-Irish descent, who with his wife emigrated from Ireland in 1765 and settled on Twelve-Mile Creek, near the border between North and South Carolina. The region was unsurveyed and sparsely settled, and the people of the neighborhood were not sure in which colony they lived. It is now believed, however, that the Jackson cabin was about a quarter of a mile south of the boundary.

Andrew Jackson, the father, died in 1767, only a few days before the birth of a son, who was named for him. The Widow Jackson was a well-meaning mother, but she placed little restraint upon her children. Andrew was the youngest of three sons, but he became the undisputed leader of the boys of the neighborhood. He indulged his enthusiasm for horse-racing and cock-fighting, and was always, without being malicious about it, ready to fight anybody. His mother died as the result of fever contracted while nursing American soldiers held prisoners by the British during the Revolutionary War, and his two brothers were killed. Andrew himself, though a lad barely in his 'teens, was once taken prisoner by the British. Several times during the war, the British raided the western part of the Carolinas, chiefly for the purpose of getting recruits and strengthening the Tories in that region. On one of these raids, in 1781, a British officer ordered young Andrew to black his boots. The boy, in a fit of rage, refused, whereupon the officer struck him with his sword, wounding him slightly, and then carried him off a prisoner. These experiences gave the boy a hearty hatred of the English, which he never lost.

The death of his mother and brothers left Andrew alone in the world, and for several years he drifted, supporting himself by such work as he could get. In 1784 he began to study law at Salisbury, N. C., and was admitted to the bar before he was twenty. In 1788 he was appointed public prosecutor for the

western district of North Carolina, the region now forming the state of Tennessee. This was a difficult position for a young man of twenty-one, but Jackson's energy and persistence carried him over many rough places. He made some enemies and many friends, and soon was one of the best-known men in the region. He also won a wife in 1791, in the person of Mrs. Rachel Robards, the daughter of one of Tennessee's pioneer settlers.

In Politics and Business. In 1796 Jackson was a member of the convention which adopted a constitution for Tennessee, and in the same

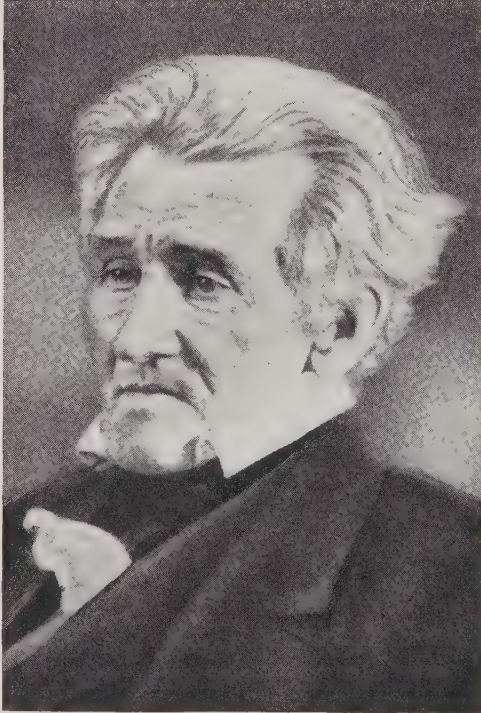


Photo: U & U

ANDREW JACKSON

While not the greatest man of his day, he was a unique, commanding figure, at once one of the most maligned and most honored men in American history. year was elected to the United States House of Representatives, where he distinguished himself by his violent opposition to President Washington. In 1797 he was elected United States Senator, but he resigned in the next year, and was for six years judge of the Tennessee supreme court. For a number of years Jackson conducted a store, managed his plantation, and fought occasional duels, in one of which he killed his opponent. It was about that time, after 1805, that he became intimate with Aaron Burr, but it is evident that he did not suspect Burr of treachery.

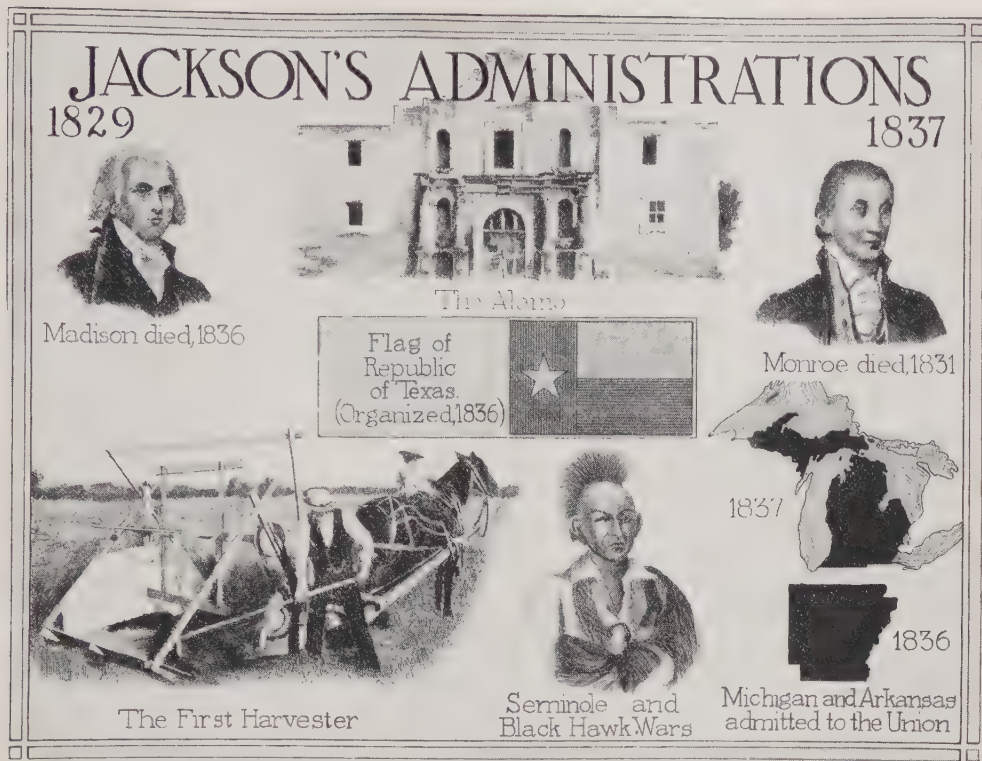
As a Soldier. The War of 1812 gave Jackson the great opportunity of his life. Up to that

time he was only a local figure, and even in Tennessee, his prestige was declining. There is a striking similarity in the early careers of Jackson and U. S. Grant. Both were born of parents in modest circumstances, and both won distinction early, Jackson in law, Grant in the army. Then they seemed to squander their time, and it appeared they were about to join the class of middle-aged men who had failed to succeed. Jackson was forty-five when the War of 1812 began; Grant was nearly forty at the outbreak of the War of Secession. War made both men national heroes and brought to each the Presidency of the United States.

Since 1802 Jackson had been major general of the Tennessee militia, and as soon as he heard the news of the declaration of war, he offered his services and 2,000 militiamen to the President. On January, 1813, he was ordered to New Orleans, and in March was organizing his troops in Natchez, when he unexpectedly received orders to disband his forces and send the men home. Jackson was furious that no pay, rations, or transportation had been provided for the men, 500 miles from home. On his own responsibility, he secured transportation for the men in a body, and the United States government was later induced to reimburse him. Later in the year 1813, Jackson commanded a body of Tennessee volunteers in a campaign against the Creek Indians, whom he defeated decisively at Horseshoe Bend in Alabama. This victory brought him again into general public notice, and in 1814 he was commissioned major general in the regular army. Assigned to command in the South, he asked permission from Washington to attack Pensacola, Fla., then Spanish territory but used by the British as a base of operations. When an answer failed to arrive promptly, Jackson took the responsibility on himself and captured the town. The victory was important because it left him free to supervise the defense of New Orleans.

Battle of New Orleans. On December 1, 1814, when Jackson arrived at New Orleans, the city was without defenses. In a frenzy of energy, he inspired his army with his own enthusiasm. Breastworks were soon constructed, trenches dug, and all preparations made against attack. Jackson proclaimed martial law and ruled the community with an iron hand. He quelled a threatening mutiny and approved the execution of six mutineers. He also arrested a judge who attempted to resist the enforcement of martial law. When civil law was reestablished, the court retaliated by fining Jackson \$1,000, but thirty years later Congress refunded the amount with interest, a total of \$2,700.

Jackson's unparalleled energy, however, bore fruit. After several minor attacks in December, 1814, the British made a grand assault on



January 8, 1815. They were defeated with heavy loss, and Jackson, the victor, became a national hero. The Battle of New Orleans was the only notable victory won on land by the Americans during the war, and it was fought, strange to say, two weeks after the treaty of peace was signed. In those days of slow communication, neither army knew until weeks later that the war was over.

Indian Campaigns, and Governor of Florida.

After receiving the thanks of Congress for his services, Jackson was appointed commander in chief of the Southern division of the United States army. Occasional Indian raids had given great trouble, and in 1818 Jackson led an army against the Seminoles, whom he defeated and pursued into Spanish Florida. His seizure of Pensacola and his arbitrary execution of two British subjects, who were accused of stirring up the Indians, caused great excitement both in the United States and in England. Efforts were made in Congress to secure a vote of censure against him, and much angry correspondence passed between the British Foreign Office and John Quincy Adams, then Secretary of State. Jackson's arbitrary conduct in these cases was later held against him by his political opponents, but for the time being, the controversy was closed by the cession of Florida to the United States, in 1819. Jackson was appointed military governor of

the new territory, but held the office for less than a year—long enough, however, to have one sharp conflict with the civil authorities. His term of office is perpetuated in the name of Florida's city of Jacksonville (which see).

Politics and the Presidency. Jackson's military career was now at an end. It had made him one of the most conspicuous men in the United States, and a hero on the frontier. The Tennessee legislature, as early as 1822, suggested his nomination for President, and in 1824 formally proposed his name as the Democratic candidate. In the election, which is described in detail in the article on John Quincy Adams, Jackson received more electoral votes than any other candidate, but did not have a majority. Under the Constitution, therefore, the choice was left to the House of Representatives, which elected Adams. Jackson and his followers were enraged at what they called the "corrupt bargain" between Adams and Henry Clay. Clay's influence in the House certainly won the Presidency for Adams, and the latter appointed Clay Secretary of State, but it is now generally admitted that the charge of a "bargain" to this effect was without foundation.

Jackson, however, seems to have been told and to have believed that he was deliberately cheated out of the Presidency, and the more he thought about it, the more bitter he became

toward Clay and Adams. This personal animosity soon led to a break in the Democratic (or Democratic-Republican) party, the followers of Adams and Clay assuming the name of National Republicans. Jackson was elected United States Senator from Tennessee in 1823, but resigned in 1825, and thereafter threw all his energies into opposition to the Adams administration. Almost from the day of Adams' inauguration, Jackson kept in view the next Presidential election. In 1828 he had his revenge, and was elected President by an electoral vote of 178 to 83 for Adams. Calhoun, who was Vice-President under Adams, was reelected.

His Administration, 1829-1837. The eight years during which Jackson was President reflect with considerable accuracy the character of the man. The administration, it has been said, was "distinctly one of conflict," and when Jackson was not engaged in some political struggle, he was upsetting traditions and conventions of every kind. This does not mean that the acts of the administration, which included the introduction of the spoils system, the Nullification controversy, and the fight against the Bank of the United States, cannot be regarded as constructive.

The Spoils System. One of the first indications of Jackson's policy was the removal of most of the government officials, even to postmasters in small villages and customs inspectors. Jackson's motives were not dishonorable; he believed that the government had become "bureaucratic," and consequently aristocratic, and felt that to substitute his own partisans was merely to make the government democratic. The slogan of the President's partisans was "To the victors belong the spoils." Quite aside from Jackson's honesty of purpose, he made the fatal mistake of appointing to office many persons whose only recommendation was that they were Jackson Democrats.

In the forty years which elapsed between the inauguration of Washington in 1789 and the inauguration of Jackson, only seventy-four government employees had been dismissed, and all of these for good reasons. During the first twelve months of his administration, Jackson dismissed over 2,000 employees, with scarcely an exception because they belonged to the political opposition. It is not fair to say that Jackson wilfully corrupted the civil service, but it is quite correct to say that he introduced into the Federal government the system which William L. Marcy and Van Buren had already perfected in the state of New York, a system in which the privilege of appointing officeholders was made one of the chief functions of government. It is true, therefore, that Jackson was the first President to build a political "machine" on the basis of patronage, and he fastened on the United States a system which persisted for half a century.

The Tariff and Nullification. In 1828, shortly before the close of John Quincy Adams' administration, Congress passed a law providing a high protective tariff. This law, called the "Tariff of Abominations," was especially disliked in the South, where it was felt that high duties on foreign manufactured goods would lead to discrimination against American cotton and other raw products. The act was resented particularly in South Carolina, but it caused indignation throughout the South and led to the first clear statement of the doctrine of nullification. This statement was made in 1830 by Robert Y. Hayne, Senator from South Carolina, in the course of the famous debate with Webster. The Webster-Hayne debate, in which slavery, nullification, and the true meaning of the Constitution were discussed with impassioned eloquence, is notable in the Constitutional history of the United States.

Two years later, in 1832, Congress passed another high-tariff law. The South Carolina legislature at once declared this law and the tariff law of 1828 unconstitutional, therefore "null and void," and threatened to secede from the Union if any attempts should be made to collect customs duties in accordance with these acts. Jackson was personally opposed to such high-tariff laws, but he prepared to execute the laws by force. He ordered troops to be concentrated at a convenient distance from Charleston, sent two warships to Charleston Harbor, persuaded Congress to pass the Force Bill, and in a stinging proclamation warned the people of South Carolina not to resist the law, saying, "The Federal Union—it must and shall be preserved." Vice-President Calhoun resigned his office, was at once elected to the Senate by the South Carolina legislature, and in fiery speeches defended the state and maintained its right to nullify and to secede. Open hostilities seemed unavoidable, when a compromise tariff was arranged, chiefly through the efforts of Henry Clay, "the great pacificator." Jackson's vigorous actions, however, temporarily halted the excessive states'-rights movement.

The Fight Against the Bank. Jackson's opposition to the Bank of the United States was not economic, but political. He was persuaded that the "money power" of the United States, led by the Bank, was preparing to crush him, and that he was the champion of the "common people." In his first message to Congress, Jackson had made clear his hostility to the Bank, and when Congress, in 1832, rallied to its support and voted to renew its charter for twenty years after 1836, Jackson vetoed the bill. The rechartering of the Bank became the chief issue of the Presidential election of 1832, in which Jackson received 210 electoral votes to 49 for Henry Clay. This overwhelming victory Jack-



"The Hermitage," Home of Andrew Jackson. This stately colonial building, which has become an American shrine, is located a few miles from Nashville, Tenn. It is owned by the state.

3601

son interpreted as a vindication of his opposition to the Bank. He ordered the Secretary of the Treasury to withdraw the government's deposits from the Bank. The Secretary refused to obey the instructions, was displaced by another who also refused and was also displaced, and it was not until September, 1833, that Jackson found and appointed a man willing, as Secretary of the Treasury, to obey his orders. The withdrawal of the government's deposits practically ended the Bank's activities. Jackson's high-handed actions in the fight against the Bank led the Senate to pass formal resolutions of censure upon him, a course without precedent. The resolutions were expunged from the Senate records by vote in 1837.

The Surplus and the Specie Circular. The Bank of the United States was not the only evidence of Jackson's financial policy. In July, 1836, he ordered the issue of the famous "Specie Circular," which directed government agents to accept only gold or silver in payment for public lands. This order created great excitement in the West, where much of the currency in circulation was the notes of unstable, or "wild-cat," banks. In the meantime, the high tariffs were bringing in more money than the government needed, the national debt was extinguished, and a surplus was piling up. Congress, a month before the Specie Circular was issued, provided that any surplus exceeding \$5,000,000 should be divided among the states as a loan. The surplus, unfortunately, was in the hands of about eighty prominent banks, who had regarded it almost as a permanent loan, and used it as the basis of an inflated credit. Suddenly called on to return this money, the banks were obliged to call in their loans. The restriction of credit coincided with a financial crisis in Europe, which caused a fall in the price of cotton. All of these circumstances combined to start a panic which broke just as Jackson went out of office, and left the burden to Van Buren.

Other Governmental Affairs. Jackson's vigorous attitude against nullification in South Carolina is in contrast to his refusal to act against Georgia. Soon after Jackson's first inauguration, Georgia passed a law ousting the Cherokee Indians from lands which they held by treaty with the United States. The Indians appealed to the President for protection in their rights, but were told that he had "no power to oppose the exercise of sovereignty of any state over all who may be within its limits." This was his decision in 1830, but two years later his position was reversed. In 1832 the Indians in the West gave some trouble, and in 1835 the Seminoles began a warfare which cost the United States \$50,000,000 and several thousand lives.

Foreign relations during Jackson's term were of little importance, but it is interesting to

note that he secured from Great Britain the right of direct and unrestricted trade in the British West Indies.

Slavery and Domestic Problems. Two states, Arkansas in 1836 and Michigan in 1837, were admitted to the Union while Jackson was President. The admission of new states was closely related to the great problem of slavery. A new period in the slavery controversy was inaugurated by the founding of *The Liberator*

by William Lloyd Garrison in 1831, and henceforth the Abolitionists gave the defenders of slavery no peace. About this time, Texas was beginning its war for independence. It was rightly believed that an independent Texas would soon be annexed to the United States, and its great area could then be divided into several states to pre-

serve the balance between the North and the South. The Senate of the United States resolved to recognize Texas as an independent nation, but the House defeated the resolution.

The death of Monroe in 1831 and of Madison in 1836, the organization of the Mormon Church in 1830, and the invention of the reaping machine by Cyrus H. McCormick, in 1831, are miscellaneous events worthy of notice. At the end of his second term, Jackson retired to his home, "The Hermitage," near Nashville, Tenn., where he passed away on June 8, 1845, in his seventy-eighth year.

Jackson's Influence. Jackson, with the possible exception of George Washington and Theodore Roosevelt, is perhaps the only President of whom it can be said that he left office more popular than when he entered it. He was the champion of the masses, and more than that, he was typical of his generation. He felt and acted as most men, growing up under new social and economic conditions, would have acted. He was autocratic, but he was also simple and unostentatious. He organized a political party and left it strong and charged with enthusiasm. To this day, "Jacksonian democracy" and "Jacksonian simplicity" are terms which politicians still use. E.D.F.

Mistress of the White House. The wife of the seventh President and the victim of the most mali-



TOMB OF JACKSON
At "The Hermitage."

OUTLINE AND QUESTIONS ON ANDREW JACKSON

Outline

I. Early Years

- (1) Birth and parentage
- (2) Youth
 - (a) Experiences during Revolutionary War
- (3) Study of law
- (4) Appointed prosecutor on western frontier

II. Beginnings of Public Life

- (1) Tennessee constitutional convention
- (2) In the House of Representatives
- (3) In the Senate
- (4) Judge of Tennessee supreme court
- (5) Military career
- (6) Governor of Florida
- (7) Elections of 1824 and 1828

III. Administration

- (1) Governmental affairs
 - (a) The "Spoils System"
 - 1. Dismissal of 2,000 employees
 - 2. Effects
 - a. Corruption
 - b. Creation of political "machine"
 - (b) The tariff and nullification

- 1. The "Tariff of Abominations"
- 2. South Carolina's threat of secession
- 3. Webster-Hayne debates
- 4. Force Bills
- 5. Compromise tariff

- (c) Financial affairs
 - 1. The fight against the United States Bank
 - 2. Surplus in Treasury
 - 3. The "Specie Circular"
 - 4. The panic
- (d) Indian affairs
 - 1. Black Hawk War
 - 2. Seminole War

- (2) Other events
 - (a) Arkansas and Michigan admitted
 - (b) *The Liberator* founded
 - (c) The Texas question
 - (d) Deaths of Madison and Monroe
 - (e) Invention of reaping machine
- (3) Election of 1836
 - (a) Issues
 - (b) Candidates
 - (c) Results
- (4) Lasting influence of Jackson

Questions

- What resemblances are there between the life of Jackson and the life of Grant?
- How did the number of employees dismissed by Jackson from government offices compare with the number dismissed in all the preceding administrations?
- To what two Presidents was Jackson violently opposed?
- How has the name of this President become proverbial in politics?
- Tell the story of the beginning of Jackson's hatred of the English.
- When and how did he believe himself to have been cheated out of a high office?
- How was the slavery struggle intensified during this administration?
- Why is it impossible to tell in what state Jackson was born?
- When did Jackson fail of election, though receiving more electoral votes than any other candidate?
- How did the government propose to get rid of the surplus in the Treasury?
- What were the results of the policy?
- When did Jackson almost precipitate a break with England?
- When and why were resolutions of censure against him passed by the Senate?
- What important battle did he fight with an enemy that was no longer an enemy?
- Who was "the great pacificator," and what part did he play in this administration?
- When did Jackson attack and capture a town on his own responsibility?
- What was the "Tariff of Abominations" and what part did it play in leading up to the War of Secession?
- How was Jackson regarded by the people when he left office?
- What was the attitude of Jackson toward the Bank of the United States, and what Presidential action caused its collapse?

cious attacks ever directed against a President's wife, lived to see her husband elected, but died before he entered the White House. During President Jackson's administration, the mistress of the White House was Mrs. Jackson's sister, Mrs. Emily Donelson, who was the wife of Jackson's private secretary; her four children were born in the White House.

Rachel Robards Jackson (1767-1828), the daughter of Colonel John Donelson, a pioneer settler of Tennessee, and divorced wife of Captain Lewis Robards, married Andrew Jackson in 1791. Afterward, it was discovered that her husband's divorce decree, which had to come from a Virginia court, had not been granted; this necessitated a second legal marriage. It was a circumstance natural enough in a frontier country, but, revived years later, it made excellent material for the scandalmongers of the bitter political campaign of 1828, and indirectly caused Mrs. Jackson's death.



Photo: U & U

RACHEL JACKSON

She was essentially a home-keeping frontier woman, but she played her rôle as the wife of a national figure with simplicity and sincerity. The home life of the couple was ideal, and the devotion of Andrew Jackson to his wife and his unswerving defense of her constitute one of the finest aspects of the hot-headed warrior's career. The Jacksons had no children, but adopted a nephew of Mrs. Jackson.

There were two White House weddings in the Jackson administration, uniting M. Pageot and Miss Lewis, and a Mr. Polk and a niece of the President.

Related Subjects. The reader who desires more information regarding events connected with the life and times of this President is referred in these volumes to the following articles:

Abolitionists	Indians, American
Adams, John Quincy	Kitchen Cabinet
Bank of the United States	Nullification
Black Hawk	Political Parties
Calhoun, John C.	Spoils System
Clay, Henry	Tariff
Force Bills	War of 1812

JACKSON, HELEN FISKE HUNT (1831-1885), an American novelist and poet, whose two best-known stories, *A Century of Dishonor* and *Ramona*, are the expression of her bitter indignation over the ill-treatment accorded the Indians by the United States government. When the former was published, in 1881, she gave a copy of it to every member of Congress, and was thereupon appointed special commissioner to investigate Indian affairs. *Ramona*, sometimes called the "Uncle Tom's Cabin of the Indians," is far from being merely a novel of the purpose type, for its beautiful descriptions, dramatic interest, and portrayal of character are of real literary value. These

qualities were given effective treatment, in 1928 in a moving picture based on the story.

Its author was born at Amherst, Mass. When she was twenty-one she married Major Edward B. Hunt, who died in 1863. The poems written in the early days of her widowhood were favorably received, and in 1870 she published a volume of verse under the pen name "H. H." Thereafter she wrote almost constantly, and *Ramona*, published the year before her death, was completed while she was struggling hopelessly against a fatal disease. In 1875, while in Colorado Springs in search of health, she married William S. Jackson, and it was there that sympathy for the Indians was awakened. See page 3605.



HELEN HUNT JACKSON

Mrs. Jackson was first buried on Cheyenne Mountain, in Colorado, but as the site became a sort of recreation ground for tourists and the people of the neighborhood, her heirs decided to reinter the body, and it now rests in the cemetery at Colorado Springs.

Her Writings. These include novels, poetry, essays, travel sketches, and tales for children. Aside from her two books mentioned above, her best-known novels are *Mercy Philbrick's Choice* and *Hetty's Strange History*. Such reliable judges as Emerson and Thomas Wentworth Higginson have expressed their admiration for her lyrics, which reveal a genuine poetic gift. Many of these are popular among children, one of the favorites being the poem entitled *October*, which begins:

O suns and skies and clouds of June
And flowers of June together,
Ye cannot rival for one hour
October's bright blue weather.

JACKSON, MICH., an important manufacturing city and the county seat of Jackson County, is situated on both banks of the Grand River in the southern part of the state, about midway between the eastern and western borders. Lansing is thirty-seven miles north, and Detroit is seventy-five miles east and north.

The first permanent settlement was made in 1829 by Horace Blackman; it was named Jacksonburgh in 1830 in honor of Andrew Jackson, seventh President of the United States. A postoffice was established in the same year and called Jacksonopolis, the present name being given the town in 1838. With the construction of the Michigan Central Railroad in 1841, the growth of the town began. It became a village in 1843 and was incorporated



Photo: U & U

WHERE RAMONA WAS MARRIED

A view of the porch of the old Estudillo home, famous as "Ramona's marriage place." It is a building of crumbling beauty, and is deeply interwoven in the beloved story. This is one of San Diego's treasured heritages from the days of Spanish occupation. (See JACKSON, HELEN FISKE HUNT, page 3604.)

as a city in 1857. Jackson claims to be the birthplace of the present Republican party, an organizing convention having been held here July 6, 1854. The city has the commission form of government. Population, 1928, 63,700 (Federal estimate).

Transportation. Transportation facilities are provided by the main lines and branches of the Michigan Central, the New York Central, the Cincinnati Northern, and the Grand Trunk railways. Electric and motorbus lines connect with other cities.

Industries. The region surrounding Jackson is rich in agricultural products, and there is a large trade in fruits, grain, and vegetables. The manufacture of automobile accessories, including batteries, fans, and wheels, engages many workers. In all, Jackson has about 150 factories. The car shops of the Michigan Central Railroad, located here, employ about 1,500 men.

Institutions. The city has a Junior College and a Carnegie Library. It is also the seat of the Michigan State Prison. D.J.O'C.

JACKSON, MISS. See MISSISSIPPI (back of map).

JACKSON, MOUNT. See GLACIER NATIONAL PARK.

JACKSON, RACHEL ROBARDS. See JACKSON, ANDREW (Mistress of the White House).

JACKSON, TENN. See TENNESSEE (back of map).

JACKSON, THOMAS JONATHAN (1824-1863), an American general, accounted by many the most efficient of the Confederate officers who fought under Lee during the War of Secession. The deep earnestness and unflinching steadiness which marked both his military and his personal character are reflected in the name by which he is universally and affectionately known, "STONEWALL" JACKSON. When, during the first Battle of Bull Run, Jackson's Virginia Brigade was seen fighting valiantly against what seemed to be overwhelming odds, General Bee called out, "There stands Jackson like a stone wall." So apt a phrase at once captured the imagina-

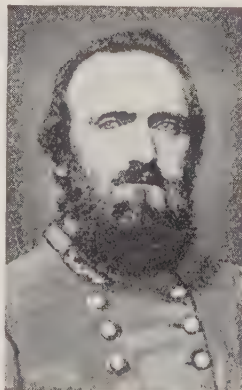


Photo: Brown Bros.

"STONEWALL" JACKSON



Photo: Jacksonville Chamber of Commerce

AIRPLANE VIEW OF JACKSONVILLE

tion of the soldiers, and from that time on Jackson was known as "Stonewall" and his troops as the "Stonewall Brigade."

Thomas J. Jackson was born on January 21, 1824, at Clarksburg, Va. (now West Virginia). Left an orphan at an early age, he received only a limited country schooling until he was eighteen, when he secured admittance to West Point Military Academy. In 1846 he was graduated with honors, and soon after joined the army that was fighting in Mexico. At Vera Cruz, Contreras, and Chapultepec, he proved himself one of the most gallant of the American officers, rising in less than a year from the rank of second lieutenant to that of brevet major.

From 1851 until the outbreak of the War of Secession, Jackson held a professorship in the Virginia Military Institute, at Lexington. Though others excelled him as a teacher, his life and character were a lasting influence for good, especially among the negroes. He was deeply and sincerely religious, and his Christian faith was the mainspring of every act of his life.

Jackson gave himself whole-heartedly to the cause of the Confederacy, though he would have rejoiced to see the Union preserved. After the Battle of Bull Run, he was promoted

to the rank of major general, and in a campaign in the Shenandoah Valley against General Banks, not only won important victories but completely baffled the Federal commanders, who tried in vain to trap him. In June, 1862, he joined Lee in the defense of Richmond against McClellan, later fought against Pope in the second Battle of Bull Run, and gave brilliant aid to his commander in the battles of Antietam and Fredericksburg. In May, 1863, while reconnoitering after dark, on the evening following the first day of the Battle of Chancellorsville, he was accidentally shot by Confederate outposts. His death more than offset the victory over the Federals, and Lee declared that he had lost his right arm. Jackson was buried, in accordance with his wish, at Lexington, Va.

Jackson has been compared with Cromwell in combining a devout religious spirit with the strict discipline of the true soldier. He prayed before every battle and returned thanks to Providence after every victory. Because of his consideration for others, he was deeply venerated and loved by his soldiers.

JACKSON COLLEGE. See MASSACHUSETTS (Education).

JACKSON PURCHASE. See KENTUCKY (Physical Features).

JACKSONVILLE, FLA., is the county seat of Duval County, the financial and industrial metropolis of the state, and, according to Federal estimate of 1928, Florida's second city. The population was then recorded as 140,700. The city is situated in the northeastern part of the state, on the west bank of the Saint John's River. It is about twenty-five miles west of the Atlantic Ocean, and about forty miles northwest of Saint Augustine.

With its setting of luxuriant semi-tropical vegetation, its equable climate, and scores of parks, Jacksonville is an attractive residential city and a favorite winter resort. The spacious Atlantic beaches are easily reached by motor over a double road of concrete, well lighted at night, and the beaches themselves form a magnificent boulevard, 400 feet wide at low tide and thirty-five miles long. Especially interesting sights for visitors are the ostrich and alligator farms near the city.

Transportation. Jacksonville is the largest railroad center of the state, having the service of five trunk lines—the Atlantic Coast Line, the Seaboard Air Line, the Georgia Southern & Florida, the Florida East Coast, and the Southern. By means of its natural harbor, including a thirty-foot channel at low tide, it has commercial intercourse with practically all of the great world ports. The city has two air fields, one of which is municipally owned.

Industry. Jacksonville has over 470 manufacturing plants, producing, among other commodities, naval stores, lumber and wood products, fertilizer, cigars, roasted coffee, steel and stone products, automobiles, and foods. Shipbuilding, the distribution of petroleum products, and the nursery business are also important.

History. The first settlement on the present site of Jacksonville was the result of a grant of 200 acres of land, which the Spanish government made to Mrs. Maria Taylor, in 1816. In 1822, after Florida was ceded to the United States, the town site was laid out and named in honor of Andrew Jackson, Florida's first territorial governor. In 1832 the place was incorporated as a city. In 1901 a fire destroyed nearly the entire business section of the city, involving a loss of \$15,000,000, but rebuilding quickly took place, and between 1900 and 1910 the city doubled its population. C.E.L.

JACKSONVILLE, ILL. See ILLINOIS (back of map).

JACKSTONES, a game popular among children, played with five small pebbles or pieces of iron made especially for the purpose. There are several different forms of the game, but all of them consist in tossing the pebbles or jacks into the air and catching them on the back or palm of the hand, in various ways agreed upon by the players. In *Ones*, the pebbles are held in the hand; a jack is then tossed into the air; the remaining four are quickly laid down, and the jack is caught before it can land. Other forms are known by

fanciful names, such as *Peas in the Pod*, *Riding the Elephant*, and *Set the Table*.

JACMEL, *zhak mel'*. See HAITI.

JACOB, *ja' kob*, in Bible story, the true ancestor of the Hebrew nation, and the twin brother of Esau, whose birthright he bought



JACOB'S LADDER

And he lighted upon a certain place, and tarried there all night, because the sun was set; and he took of the stones of that place, and put them for his pillows, and lay down in that place to sleep. And he dreamed, and behold a ladder set up on the earth, and the top of it reached to heaven: and behold the angels of God ascending and descending on it.—*Genesis XXVIII; 11, 12.*

for a mess of pottage. When his father Isaac was 137 years old and nearly blind, Jacob, by dressing like his brother, secured the blessing which went with the birthright. Upon discovering the deception, Esau was very angry and threatened to kill Jacob, so the latter departed for Haran on the pretext of seeking a wife. He stayed there for twenty years, married Leah and Rachel, the daughters of his Uncle Laban, for whom he worked, and then started back to Canaan. On the way he was met by an angel with whom he wrestled all night. This event proved to be the crisis in Jacob's life, for from that time on he trusted in God's strength instead of his own. Upon leaving him at daybreak, the angel blessed him, saying, "Thy name shall be called no more Jacob, but Israel: for as a prince hast thou power with God and with men" (*Genesis xxxii, 28*). Thus the Jews, who are descended

from Jacob, are often called the children of Israel.

After meeting Esau and obtaining his forgiveness, Jacob crossed the Jordan and lived at Mamre thirty-two years before taking his family down into Egypt, at the behest of his son Joseph, where he stayed until his death at the age of 147. In his later life, he acknowledged the wickedness of his earlier career and lived up to his new name, Israel, which means *hero of God*. According to his wish, his body was taken to the cave of Machpelah to be buried in the tomb of Abraham.

Related Subjects. The reader is referred to the above reference to *Genesis* and to the following articles in these volumes:

Esau Isaac Joseph Rachel

JACOBINS, *jak' o binz*, the most famous club in France during the troubled period of the French Revolution. It met in a hall of the former Jacobin convent in Paris, from which it took its name. It increased rapidly in favor, gained importance upon the removal of the court and National Assembly to Paris, and gradually became the ruling power of the Revolution. The Jacobins originated the terrible Commune of Paris, and for a time they were very powerful. During the Reign of Terror, they ruled through Robespierre, who was their most influential member, and after his downfall, in 1794, they were overthrown. In 1799 their club was closed by Emmanuel Sieyès, the great opponent of the extreme Revolutionists. When organized at Versailles, in 1789, it was known as the Club Breton; later, as the Society of Friends of the Constitution.

The term *Jacobin* is now often applied to anyone expressing extreme views in politics.

Related Subjects. The reader is referred in these volumes to the article *FRENCH REVOLUTION* and the biographical sketches of *ROBESPIERRE* and *SIEYÈS*.

JACQUARD, *zha kahrd'*, **JOSEPH MARIE** (1752-1834), a French mechanic whose chief claim to renown is his invention of the Jacquard loom, which simplified the art of weaving. The loom was first exhibited in 1801. It was a system of horizontal and perpendicular bars, springs, and hooks, adjustable to any kind of loom, and it relieved the laborer of the irksome task of guiding the work by hand. When Jacquard attempted to put it into general use in Lyons, he was seized by a mob and almost lost his life, for the workmen felt that the new invention would decrease the demand for labor. The French government purchased his invention. See *WEAVING*; *TAPESTRY*.

JADE, an ornamental stone highly prized by the Chinese and Japanese, by whom it is carved into beautiful and elaborate designs. Western people use it for rings, necklaces, and ornamental purposes. There are two minerals classified as jade. The more common

form is *nephrite*, a compound of calcium, magnesium, and silica, with some iron. It is a hard, tough, compact mineral, varying in color from white to leaf-green and darker green. The greenish color is imparted by the iron. The *jadeite* variety is made up of sodium, aluminum, and silica. Its color is white or greenish-white to emerald-green. Jadeite is rarer than nephrite and more highly esteemed by the Chinese; it has the same characteristics of hardness, toughness, and compactness. Small lumps resist pounding with a hammer. Both varieties are translucent to opaque. Nephrite has a brighter luster.

Jade is one of the oldest of stones used by man, and by the Chinese it is regarded as the most perfect. Because of its hardness and toughness, great skill and much labor are required to carve it; thus it has ranked as a truly princely possession. Specimens of tools made from jade have been found in the lake dwellings of an ancient race in Europe, supposedly of the Stone Age (which see), and jade quarries have been worked by the Chinese for more than 2,000 years. When the ancient Mexicans and Peruvians were found by the Spaniards, they possessed implements of jade, and similar tools were in use by the natives of New Zealand when they were first discovered. The chief jade mines of to-day are in Burma. T.B.J.

JAL, *ja' el*. See *DEBORAH*.

JAFFA, OR **YAFFA**, *yakh' fah*, a seaport of present-day Palestine. See *PALESTINE* (The Cities).

JAGGERY, *jav' ur ie*. See *PALM*.

JAGT, a fishing boat of Norway. See *NORWAY* (Fishing).

JAGUA, *BAY OF*. See *CUBA* (Cities: Cienfuegos).

JAGUAR, *jav' wahr*, or *ja gwahr'*, the largest member of the cat family in the Americas, its



Photo: Visual Education Service

THE JAGUAR

native home, and next to the African lion and tiger in size, strength, and ferocity. It is found as far south as Northern Patagonia in South America, and in pioneer days ranged as far north as Arkansas in North America. It is now rarely found north of Mexico.

The average size of the jaguar is six to seven feet from nose to tip of tail. The head is somewhat round in shape, and the legs are large



Specimens of Jade. (1) Chien-Lung period (1736-1795). Antique ceremonial ax, very finely carved. It is white flecked with brown. (2) Same period. Archaic decoration, in spinach green, all carved from one piece. (3) Double flower holder; brownish white. (4) White jade goddess; period unknown. (See next page.)



Other Jade Specimens. (1) Chien Lung period. White carved bowl, very thin and very fine; on carved teak stand. (2) Same period. Celadon jade, sea-green in color. (See article, page 3608)

Courtesy of Marshall Field & Co.

in proportion to the size of the body. The coat, though sometimes almost black, is usually yellowish-brown, marked with spots surrounded with rings of a darker brown, and is a valuable fur. The animal lives principally along densely wooded streams where food is plentiful, but it is also found on the plains of Paraguay and Argentina. Its habits differ with its living conditions. It springs upon prey from ambush, and also attacks in the open, subsisting upon monkeys, deer, tapirs, and numerous smaller animals. Some jaguars are good fishers. The jaguar's roar is very loud and terrifying. It rarely preys on man, but is sometimes driven by hunger to attack the unprotected traveler.

M.J.H.

Scientific Name. The jaguar is a member of the family *Felidae*. Its scientific name is *Felis onca*.

JAHN, yahn, FRIEDRICH LUDWIG. See TURNVEREIN, subhead; PHYSICAL EDUCATION (Development Through the Centuries).

JAIL FEVER. See TYPHUS FEVER.

JAIPUR, ji poor', OR JEYPORE, ji pore'. See INDIA (The Cities).

JAIRUS, ja i' rus, DAUGHTER. See APOSTLES (John).

JALAP, jal' ap, a twining plant belonging to the same family as the honeysuckle and morning-glory, whose root is the source of a well-known laxative drug of the same name. Jalap is so called because it is found chiefly around Jalapa, a town in Mexico about 4,800 feet above sea level. The root, which looks much like the turnip, varies in size from a hazelnut to a pear. It contains about ten per cent of jalap resin, which has pronounced purgative properties. The derived drug is usually combined with calomel or bitartrate of potash. The addition of a little ginger will overcome a tendency to cause cramping pains. Jalap should be taken only as directed by a physician.

B.M.D.



JALAP

Scientific Name. Jalap belongs to the family *Convolvulaceae*. Its botanical name is *Ipomoea purga*.

JAMAICA, ja ma' kah, "the Queen of the Antilles," the largest and most important of the British West Indies, is an island paradise of tropical vegetation. Its name is derived from the Indian name *Jaymaca*, meaning *the island of springs*.

This mountainous island, 144 miles long and fifty miles wide, including the smaller Turks and

Caicos islands, has an area of 4,424 square miles, about 500 square miles less than the area of Connecticut. The island rises from the sea like one of the great turtles which abound in its waters, the central mountain ridges resembling its rough, horny back. From the narrow, golden rim of the sandy lowlands encircling the island, the land rises to the purple, cloud-capped peaks of the Blue Mountains, which extend from east to west through its center. The altitudes of the summits range upward from 2,000 feet, the loftiest peak being Blue Mountain, rising 7,360 feet above the sea. The uplands and mountain slopes are covered with a luxuriant growth of flowers and forests hung with parasitic mosses, vines, and orchids, and inhabited by cuckoos, humming birds, brilliant parrots, and butterflies; a place—

Which all the year is glad with blooms and girt
By groves made green from the bright streamlet's
wave.

Soft are its slopes and cool its fragrant shades.

The coast line is well indented, containing numerous good harbors, the most important of which is that of Kingston. Short, rapid rivers flow north and south from the central mountain ridge. Except in the humid lowlands of the coast, the climate is delightful. The mountains are ideal as both a summer and a winter resort, the annual temperature ranging from 70° to 85° F. at Kingston. The air is of transparent clearness. The rainy seasons are in May and October, but no month is entirely without rain. Storms arise with amazing suddenness, and the skies are quickly cleared.

The People. At the census of 1921, the population was 858,000; it was estimated in 1925 to be 916,620. Only two per cent of the people are white, while seventy-seven per cent are negroes and nearly twenty per cent are "colored," that is, half-castes. Besides these,

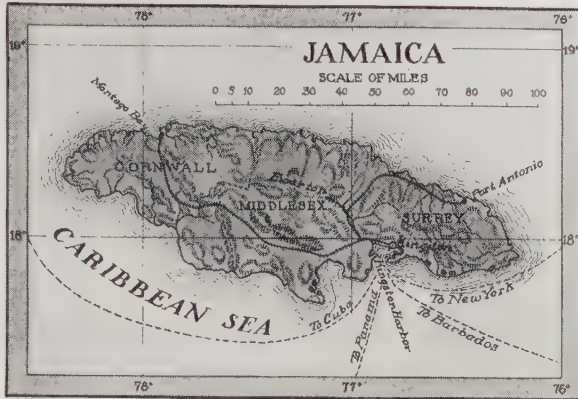




Photo: Visual Education Service

A MARKET PLACE IN JAMAICA

there are 18,600 East Indian coolies and 3,700 Chinese. Nearly half of the population is illiterate. The East Indians were imported for labor on the plantations after the liberation of the slaves in 1833. The Chinese are the shopkeepers; the "colored" population is largely employed in the trades and professions. The negroes are generally indolent, living upon the abundant fruit of the soil, to be had without effort. The mango is so abundant and provides so large a part of the food of the native population that it discourages industry.

The Cities. There is only one city which has a population exceeding 50,000, and that is the capital, Kingston. The second city in size is Spanish Town.

Kingston, the chief port, is situated on the south-east coast of the island and the north shore of a landlocked harbor, which for its size is one of the finest in the world. The place was founded in 1693 and almost at once grew rapidly in importance. In 1872 it became the commercial and political capital of the island. As the town has been practically rebuilt since a severe earthquake in 1907, the many new buildings, electric street cars, and other improvements give it a very modern appearance. Population, 63,000.

Spanish Town, the former capital, now a small city of only 8,700, is situated on the south coast, eleven miles west of Kingston. Although its importance quickly diminished after it ceased to be the capital, it is still the second city of the island.

Industry and Commerce. The soil is of marvelous fertility, and agriculture is the chief industry. There are extensive plantations of sugar, tobacco, pineapples, and coffee, and

groves of banana, cacao, coconut, orange, mango, and grapefruit trees. The pimento, or allspice, tree is found almost exclusively in Jamaica, and quantities of ginger and arrow-root are grown. The mountain regions are largely guinea-grass fields and pasture lands for livestock. The forests produce much logwood, rosewood, mahogany, ebony, lancewood, and lignum-vitae. Turtle-fishing is an important industry along the coast. Some iron ores, lead, cobalt, and a great variety of marble, porphyrites, and granites are found, but they are not worked to any extent.

The trade of the colony is chiefly with the United States, the British Isles, and Canada. Bananas and other fruits, sugar, logwood extract, rum, coffee, and pimento are the most important exports. At Port Royal, at the entrance to Kingston harbor, is located the principal British naval station in the West Indies. There is weekly mail service to and from England, and cable and mail communications with the United States, and with Halifax, N. S.

Government. Under the colonial government of England, the island is content and unshaken by political factions. Assisting the governor in the administration of the colony is a Privy Council appointed by the Crown. There is a legislative council consisting of the governor, ten members nominated by the governor, fourteen elected, and five ex-officio members. Justice is administered by high and circuit courts and resident parish magistrates, without trial by jury. The Turks, Caicos, and

Cayman islands and Morant and Pedro cays are dependencies under the government of Jamaica. In 1919 women were enfranchised.

History. Jamaica, originally inhabited by the Arawâk Indians, was discovered by Columbus in 1494. Spanish occupation began in 1509, and before the middle of the seventeenth century, the native population was almost extinct. The island was captured by the English in 1655, and British possession was confirmed by the Treaty of Madrid in 1670. At that time it was the rendezvous of buccaneers and pirates.

The demand for plantation labor led to the organization of the Royal African Company in 1672, and Jamaica became the greatest slave market in the world. In 1833 all slaves were liberated. This measure, occurring at the height of Jamaica's prosperity, had a disastrous effect upon the industries of the colony, for the liberated slaves were too indolent to work.

On January 14, 1907, Jamaica suffered a serious earthquake, in which over 600 lives were lost, and Kingston was almost entirely destroyed. Tropical hurricanes also cause much damage, at intervals.

JAMAICA BAY. See NEW YORK CITY.

JAMAICA MIGNONETTE, *min yun et'.* See HENNA.

JAMAICA PEPPER. See PIMENTO; ALL-SPICE.

JAMES, the name of two kings of England. The accession of the first James marks the beginning of the rule of the House of Stuart in England.

James I (1566-1625), who was the son of Mary Queen of Scots and Lord Darnley, succeeded to the throne of Scotland in 1567, as James VI. In 1603, on the death of Queen Elizabeth, last of the English House of Tudor, he was crowned king of England with the title James I. Scotland and England were thus united under one sovereign, though their political union was deferred until the accession of Queen Anne. James, like the other members of the Stuart family, believed firmly that kings ruled by "divine right." He quarreled frequently with his Parliaments, whose determined opposition to his acts of tyranny had an important influence in preventing the decline of popular liberty in the kingdom.

Early in his reign (1605), a number of Roman Catholics, goaded by unjust persecution, plotted to blow up the Parliament House on the opening day of the first session, but the conspiracy was discovered and its leaders executed. Two years later, the first permanent English colony was established in America and named for the sovereign (Jamestown, 1607). A second permanent colony was founded in Massachusetts in 1620 by a band of Puritans who were driven out of England by the king's threat "to harry out of the land" all who refused to conform to prescribed forms of worship.

Other important events of this reign were the publication in 1611 of the Authorized Version of the English Bible, known as the *King James Version*;

the colonization of the Irish province of Ulster by Protestant settlers from England and Scotland; the



Photo: Brown Bros.

JAMES I

execution of Sir Walter Raleigh; and the impeachment by Parliament of the king's great chancellor,



Photo: Brown Bros.

JAMES II

Sir Francis Bacon. In 1589 James had married Princess Anne of Denmark; the marriage of their daughter Elizabeth to the German elector of the Palatinate resulted, years afterward, in the founding of a new English dynasty [see George (I, England)].

James II (1633-1701), son of Charles I and of Henrietta Maria of France, succeeded to the throne on the death of his brother Charles II, in 1685. Immediately after his accession, he endeavored to carry out two cherished plans: to rule independently of Parliament and to restore the Roman Catholic religion in England. A rebellion headed by the Duke of Monmouth was easily suppressed, but the king's determined efforts to restore Catholicism roused the entire nation against him, and by the "Glorious Revolution of 1688" he was forced to abdicate, the throne being given to William, Prince of Orange, and Mary, daughter of James, whose reign is known as that of William and Mary. The dethroned king fled to France, where he was received with cordiality by Louis XIV. Assisted by troops furnished by Louis, James sought to win back his throne by invading Ireland, but in 1690 he was hopelessly defeated by William at the Battle of the Boyne. The rest of his life was spent in retirement in France.

Related Subjects. For a more detailed account of many of the events and personages connected with these reigns, the reader is referred in these volumes to the following articles:

Bacon, Francis	Monmouth, Duke of
Bible	Puritans
Boyne, Battle of the	Raleigh, Sir Walter
Divine Right of Kings	Stuart, House of
Elizabeth	Tudor
Gunpowder Plot	Windsor, House and
Mary (II, England)	Family of
Mary Stuart	

JAMES, the name given three personages mentioned in the New Testament. (1) James the son of Alphaeus (*Matthew* x, 3), listed among Christ's Disciples, may have been a brother of Matthew, but this supposition cannot be proved. Some identify him with James the Little, son of Mary, wife of Clopas, and he has been mentioned as the Lord's brother. Both suppositions are of doubtful validity. (2) James the Apostle, one of the sons of Zebedee, was the brother of John, and probably was the elder of the two. He was the first of the Apostles to meet a martyr's death, at the hands of Herod Agrippa I. (3) For James, the brother or cousin of Christ, see **JAMES, SAINT**.

JAMES, HENRY (1843-1916), one of the most distinguished novelists of his time, though not one of the most popular. He was born in New York City, but died a naturalized Englishman. His father was a well-known theologian, and his older brother was the distinguished psychologist, William James (see **JAMES, WILLIAM**). Henry James was educated in New York and abroad, and began a literary career after he had abandoned the study of law, which did not interest him. He lived in Europe after 1869. In 1915, to show his sympathy for the allied cause in the World War, he became an English citizen.

His Place in Literature. Henry James was one of the most skillful exponents of the so-called "international novel." He liked to portray typical American characters in a Continental or English setting, and he presented most effectively the contrast between two spheres of society, differing in ideas, manners, customs, and points of view. His earlier novels were more simply written and less complicated in treatment than those of his more mature period. In later years, he developed an intricate style in which the reader became lost in the mechanics of the sentence. One author called his novels "marvels of cleverness but splendidly unreadable."

It has also been said that Henry James was a novelist who wrote like a psychologist, while his brother was a psychologist who wrote like a novelist. The novels of Henry James include *Roderick Hudson*, *Daisy Miller*, *An International Episode*, *The Bostonians*, *The Tragic Muse*, *What Maisie Knew*, *The Awkward Age*, and *Julia Bride*. He was also the author of several volumes of biography and essays, including literary criticisms and travel sketches.



Photo: Brown Bros.

HENRY JAMES

He has been defined as "a kind of supercivilized connoisseur of the emotions."

JAMES, JESSE. See **BANDIT**.

JAMES, SAINT, believed to have been the Lord's brother or cousin, and the head of the Church at Jerusalem from its organization. As head of the Church and board of elders, he devoted himself to helping the Jews in the difficulties which they had to overcome before adopting Christianity. They gave him the name of "the Just" because he was so fair to the Jewish-Christian conscience. After the reference to James in *Acts* XXI, 18, the date of which is A.D. 58, there is no further mention of him in the Bible, but secular history relates that he was murdered in A.D. 62, during a mob uprising of the Jews.

Epistle of James, the first of the seven epistles in the New Testament addressed to Christians in general. The book, written by Saint James, emphasizes works as the proof of faith; its object was to reform the lately Christianized Jews and encourage them in the trials to which they were exposed. It is supposed to have been written before A.D. 45, thus being the earliest New Testament writing.

JAMES, WILLIAM (1842-1910), a distinguished American psychologist and the brother of Henry James, the novelist, was born in New York City. His early education was received under tutors, at home and abroad, but he studied later at the Lawrence Scientific School, and in 1869 received the M.D. degree

from the Harvard University Medical School. From 1872 to 1907 he taught at Harvard, his subjects being, successively, anatomy, physiology, philosophy, and psychology. In 1899-1901 he was Gifford lecturer on natural religion at the University of Edinburgh, and in 1908 Hibbert lecturer on philosophy at Manchester College, Oxford.

His *Principles of Psychology* appeared in 1890, and at once won him international recognition as a leader of the analytical psychologists. Several of the theories which he advanced, notably that of the "fringe of consciousness," attracted wide attention. The fresh and charming style in which this and his other works were written gave rise to the statement that William James should have been the novelist, while his brother, with his involved analysis of mental processes, should have been the psychologist. See PRAGMATISM.



WILLIAM JAMES

His Books. While *Principles of Psychology*, mentioned above, was his outstanding publication, he left other notable books. *Pragmatism—a New Name for Some Old Ways of Thinking* aroused much opposition, but attracted also zealous advocates; *Varieties of Religious Experience*; *The Will to Believe*; *A Briefer Course in Psychology*, which became very widely used as a college textbook; *Human Immortality*; *The Meaning of Truth*; and *Talks on Psychology and Life's Ideals* are most important in the list.

JAMES BAY, the southern extension of the great inland sea known as Hudson Bay, in the northeastern part of Canada. The bay was named in honor of the English navigator, Thomas James, who explored it in 1631 and 1633 in the endeavor to discover the oft-sought Northwest Passage to the Pacific (see NORTHWEST PASSAGE). It is about 300 miles long and 160 miles wide, and contains a number of islands, Agomaska, with a length of seventy miles, being the largest. Among the large rivers flowing into the bay are the Moose, Nottaway, and Albany. Moose Factory, at the mouth of the Moose River, is one of the most important trading stations. The Canadian Department of Naval Service, in carrying on hydrographic work, has decided that the climate and country around James Bay are favorable to great agricultural development, particularly dairy farming, and the extension of the Temiskaming & Northern Ontario Rail-

way from Cochrane to the shores of the bay will open this region to settlement. For illustration, see HUDSON BAY.

JAMESON, *ja' me sun*, LEANDER STARR (1853-1917), an Englishman, educated as a physician, who became world famous as leader of "Jameson's Raid" into the Transvaal, which was the outcome of the Uitlander disturbance in Johannesburg. Jameson was born in Edinburgh, and after studying medicine, went to South Africa in 1878 and established a lucrative practice at Kimberley. During the troubles between the Uitlander reform party and the Boer government, Jameson, who had become premier of the Cape of Good Hope province, concentrated the army of Rhodesia at Mafeking on the Transvaal frontier, by order of Cecil Rhodes, and advanced with 500 troopers to support the Reformers. His army was defeated, and Jameson was imprisoned at Pretoria and handed over to the British authorities for trial. He was condemned to fifteen months' imprisonment, but became ill and was released. In 1900 he was elected to the Cape legislative assembly for Kimberley, and was premier of Cape Colony from 1904 to 1908. See SOUTH AFRICAN WAR; FILIBUSTERS.

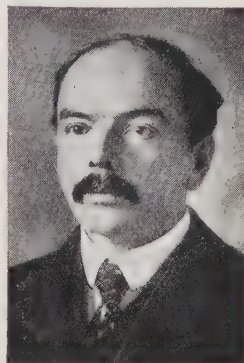


Photo: Brown Bros.

LEANDER STARR JAMESON

JAMES RIVER, the largest stream in Virginia flowing wholly within that state, has historic interest because on its banks, in 1607, the first permanent English colony in America was settled (see JAMESTOWN). The Jackson and Cowpasture rivers unite in the Allegheny Mountains to form the James. Its general direction is southeast for a distance of about 450 miles, and it empties into Chesapeake Bay through the channel known as Hampton Roads, thence into the Atlantic Ocean. The Appomattox, one of its chief tributaries, enters sixty-six miles from the sea, and from that point the James is an estuary or tidal river and navigable by ocean steamers. Small craft ply forty miles farther upstream to Richmond, the capital of Virginia.

JAMES RIVER. See SOUTH DAKOTA (Rivers and Lakes).

JAMESTOWN, the oldest English settlement in America to survive the hardships of pioneer days. In 1607 the London Company (which see) sent an expedition to America under the command of Captain Christopher Newport. A settlement was made about

thirty-two miles inland, on the river afterward called James, as this location was thought to be reasonably safe from the visits of Spanish buccaneers. To Captain John Smith, one of the party, is largely due credit for survival of the company. He kept back the Indians and set tasks for those of the indolent colonists who thought they could live without work. The year 1609, when Smith returned to England because of a wound, was known as starvation year. The few who survived had started to leave, but upon meeting another expedition, they returned.

In 1619 the House of Burgesses, the first representative legislative assembly in the United States, met in Jamestown, which was the capital of Virginia from 1607 to 1698. Also, in the year 1619, slaves were brought into Jamestown, marking the introduction of slavery into the thirteen colonies. The place, after many severe fortunes, was abandoned about 1700. Mary Johnston's novel, *To Have and to Hold*, published in 1899, gives one of the most interesting accounts of the life of the colonists. On the site of the settlement, which is owned by the Association for the Preservation of Virginia Antiquities, may be seen ruins of a church, the fort, and a few dwellings. See VIRGINIA (History); SMITH, JOHN, and page 3617.

[In 1907 the Jamestown Tercentenary Exposition was held on the south shore of Hampton Roads, near Norfolk, Va. Thirty states were represented. A wonderful display of the navies of the world was made in Hampton Roads.]

JAMESTOWN, N. Y., a summer resort and manufacturing city of Chautauqua County, is situated on Chadakoin River, the navigable outlet of the famed Chautauqua Lake, two miles distant. It is in the extreme southwestern part of the state, twenty-five miles south of Lake Erie and sixty-nine miles south and west of Buffalo. Population, 1928, 46,000 (Federal estimate).

The city is situated on hills at an altitude of 1,500 feet, more than 800 feet higher than Lake Erie. Chautauqua, the internationally famous summer school on the lake, was founded here in 1874. It can accommodate 15,000 guests daily during July and August, and it conducts over 200 classes in science, literature, music, and other subjects. The New York Symphony Orchestra is on the music program each year (see CHAUTAUQUA).

Jamestown was named in honor of James Prendergast, the first settler. The town was founded in 1810, incorporated in 1827, and chartered as a city in 1886.

Transportation. The city is served by the Erie and the Jamestown, Westfield & Northwestern railroads, and by interurban and steamboat lines to other resorts on the lake.

Industry. Jamestown has become a manufacturing place of importance, with about 100 industrial plants. These include about fifty furniture factories, extensive worsted mills, and manufactories of metal furniture and trim, automobile parts, tools, washing machines, and wooden toys.

D.F.H.

JAMESTOWN COLLEGE. See NORTH DAKOTA (Education).

JANESVILLE, WIS. See WISCONSIN (back of map).

JANICULUM HILL. See ROME (The Seven Hills).

JANIS, ELSIE, a talented American actress who has been a popular comedienne since her childhood.

She was born in Columbus, O., the daughter of John E. and Janis E. Bierbower; her mother's given name, *Janis* (pronounced with a short *a*), was adopted by her for stage purposes. On her father's side, she is a descendant of ancestors who arrived in America in 1747 and who fought under Washington. During the many years in which she has delighted American audiences with her vivacity, charm, and gift for mimicry, Miss Janis has been equally successful in comedy drama, musical comedy, and in vaudeville. She was privately educated and is unmarried.

Her Principal Roles. Miss Janis made her initial appearance, in 1897, as Cain in *The Charity Ball*. Following this, she was very successful in *The Belle of New York*, *The Fortune Teller*, *The Vanderbilt Cup*, *The Hoiden*, *The Fair Co-Ed*, and *The Slim Princess*, playing light comedy rôles. As a co-star with Montgomery and Stone in *The Lady of the Slipper*, she showed her talent for musical comedy, and added to this reputation in successive productions of *Elsie and Her Gang*, a series of musical frolics written by herself and based on her experiences as entertainer in the war zone during the World War.

JANIZARIES, jan' ih za rihz, a name given to special soldiers of Turkey six centuries ago. The group was organized by Orkhan, son of Othman, founder of the Ottoman Empire. Orkhan levied upon conquered nations for their boys, whom he trained in Mohammedanism and soldiery; these, with picked native troops, were organized into the corps of Janizaries.

JANNINGS, EML. See MOVING PICTURES (list of players).



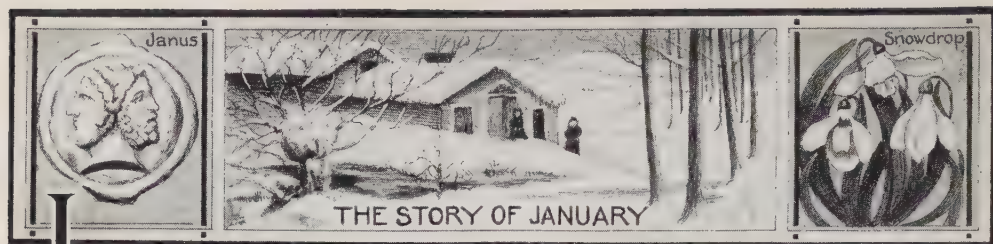
JAMESTOWN IN 1622



Photo: U & L

America's First Brick Church. In 1673 the people of Jamestown began its construction with bricks purchased in England. All that now remains of this historic building is shown in the illustration.

3617



JANUARY, the first month of the year according to the modern calendar, is a time of beginnings, and the Romans signified this fact by naming it after Janus, the god of beginnings, whose festival fell within the month. He was a double-headed deity, with one face looking forward and one looking backward, and this is symbolical of the month, which inspires thought of the past as well as of the future. The special flower for the wintry month of January is the snowdrop; the garnet is its gem.

Its History. Like February, January was not one of the original months, the year according to the earliest Roman calendar having begun with March. Numa Pompilius, tradition says, added January, but gave it only thirty days; but the reforms of Julius Caesar gave it the thirty-one days which it has kept ever since (see CALENDAR). Its character has won for it various names in different countries. The Scandinavians, for instance, called it after Thor, the god of storms; and the old Anglo-Saxons spoke of it as Wolfmonth, because, during its bitter cold days, the wolves, who could find nothing alive in the forests on which they could live, came into the villages in search of food.

Its Place in the Year. In most parts of the northern hemisphere, January is the severest of the winter months. In such sections as California and the Southern states, where winter, as Canada and the Northern United States understand that term, is unknown, January is likely to be a rainy season, but elsewhere there are disagreeably low temperatures. Toward the end of the month, however, there occur days which are warm enough for March, and the "January thaw" is a well known phenomenon.

No month of the year has fewer signs of nature's activities. There is less movement among the birds than during any other month—the all-winter residents have arrived and settled down; those which go south for the winter have left long before, and the hardest of the spring migrants have not started north. The cold does not seem to affect the winter birds seriously, nor do the storms; but they must have food, and plenty of it; and food is scarce in northern latitudes in January. Where berries or grains are to be found, birds, even of those species which usually winter far south, occasionally stay through the entire season.

January has one holiday universally observed in Christian countries—New Year's Day (which see), which has in every land its own characteristic customs. The other special day of most importance is Twelfth Day, so called because it is the twelfth day after Christmas, on which is celebrated the festival of the Epiphany.



Janus am I; oldest of potentates!
Forward I look and backward and below.
I count—as god of avenues and gates—
The years that through my portals come and go.

—LONGFELLOW.

carrying keys, and is crowned with laurel. Many elaborate ceremonies were performed in his honor.

JAPAN. See VARNISH; JAPANING.

JANUS, in Roman mythology, the god for whom the first month of the year, January, was named (see JANUARY). As the "spirit of opening," he was invoked at the beginning of all undertakings, and therefore was naturally the god of the beginning of the day and also of the beginning of the year. As the guardian of all the gates in Rome, he was usually represented as having a doublehead that looked both ways. In time of war, the gates of the chief temple of Janus at Rome were always left open, and in peace they were closed. As the god of gates, Janus is represented as

JANUARY CALENDAR

Birthdays

1. Paul Revere, 1735
2. James Wolfe, 1727
3. Cicero, 106 B.C.
4. Jacob L. C. Grimm, 1785
6. Joan of Arc, 1412
7. Israel Putnam, 1718
8. Wilkie Collins, 1824
10. Ethan Allen, 1737
11. Alexander Hamilton, 1757
- Sir John A. Macdonald, 1815
12. Edmund Burke, 1729
- J. H. Pestalozzi, 1746
13. Salmon P. Chase, 1808
14. Benedict Arnold, 1741
15. Molière, 1622
16. Robert W. Service, 1876
17. Benjamin Franklin, 1706
18. Daniel Webster, 1782
19. James Watt, 1736
- Robert E. Lee, 1807
- Edgar Allan Poe, 1809
21. John C. Fremont, 1813
- "Stonewall" Jackson, 1824
22. Francis Bacon, 1561
24. Charles James Fox, 1749
25. Robert Burns, 1759
27. Mozart, 1756
- Emperor William II, 1859
28. Charles George Gordon, 1833
- Alexander Mackenzie, 1822
29. Thomas Paine, 1737
- William McKinley, 1843
30. Walter Savage Landor, 1775
- Charles, Baron Metcalfe, 1785
31. Ben Jonson, 1573
- Gouverneur Morris, 1752
- Franz Schubert, 1797

Events

1. People everywhere confidently expected the second coming of Christ, 1000
- Ireland became a part of the United Kingdom, 1801
- Greece declared itself independent of Turkey, 1822
- Lincoln issued Emancipation Proclamation, 1863
- Commonwealth of Australia proclaimed, 1901
2. Battle of Murfreesboro, 1863
- Port Arthur surrendered to the Japanese, 1905
3. Herbert Hoover made director-general of war relief in Europe, 1919.
4. Utah admitted to the Union, 1896
6. Battle of Ladysmith, in South African War, 1900
- New Mexico admitted to the Union in 1912.
- Theodore Roosevelt died, 1919.
7. First Presidential election held in United States, 1789
8. President Wilson laid his "Fourteen Points" before Congress, 1918
10. Allies and Germany ratified Treaty of Versailles, 1920
12. Arbitration treaty signed by Canada and United States, 1909
13. General Huerta, Mexican Dictator, died, 1916
14. Norway was united with Sweden, 1814
- Kingston, Jamaica, nearly destroyed by an earthquake, 1907
15. British Museum opened, 1759
16. Eighteenth Amendment ratified by last of required thirty-six states, 1919
- Provisional government of the Irish Free State constituted, 1922
17. Battle of the Cowpens, 1781
18. William I proclaimed German emperor, 1871
- France annexed Madagascar, 1896
- Opening of Versailles Peace Conference, 1919
10. Robert Young Hayne began his great debate with Webster, 1830
- Body of Columbus transferred to Havana, 1796
21. Execution of Louis XVI of France, 1793
- Corps of Canadian mounted riflemen sent to South African War, 1900
22. Edward VII became king of England, 1901
- Pope Benedict XV died, 1922
23. Kansas-Nebraska Bill introduced in Congress by Stephen A. Douglas, 1854
- Battle of Spion Kop, 1900
24. Prussia annexed Schleswig-Holstein, 1867
- Discovery of gold in California, 1848
- Naval battle in North Sea, 1915
25. Transcontinental telephone service established in United States, 1915
26. Michigan admitted to the Union, 1837
- Charles George Gordon murdered, 1885
27. Charles I sentenced to death, 1649
- The Canadian Great Western Railway opened, 1854
28. Paris surrendered to the Germans, 1871
- Colonel Goethals appointed first civil governor of Panama Canal Zone, 1914
29. Kansas admitted to the Union, 1861
- Zeppelin raid on Paris, 1916
30. Charles I beheaded, 1649
- Earl of Elgin became Governor-General of Canada, 1847
- Russians occupied Tabriz, 1915
31. The *Great Eastern*, largest steamer then in existence, launched, 1858

For Study

Barberry
Burns' *To a Mouse*
 To a Mountain Daisy
Fire

Franklin's boyhood
Freezing
Grimms' *Fairy Tales*
Janus

Paul Revere's Ride
Snow
Steam
Steam Engine

QUOTATIONS FOR JANUARY

1. Ring out, wild bells, to the wild sky,
The flying cloud, the frosty light;
The year is dying in the night;
Ring out, wild bells, and let him die.
Tennyson.
2. Ring out the old, ring in the new,
Ring, happy bells, across the snow;
The year is going, let him go;
Ring out the false, ring in the true.
Tennyson.
3. More helpful than all wisdom is one draught
of simple human pity that will not forsake
us.
George Eliot.
4. Chill airs and wintry winds! My ear
Has grown familiar with your song;
I hear it in the opening year—
I listen, and it cheers me long.
Longfellow.
5. Good health and good sense are two of life's
greatest blessings.
Publius Syrus.
Ah! what avail the largest gifts of Heaven,
When drooping health and spirits go amiss?
How tasteless then whatever can be given!
Health is the vital principle of bliss,
And exercise of health.
Thomson.
6. So long as we love, we serve;—and no man is
useless while he has a friend.
Stevenson.
The man who melts
With social sympathy, though not allied,
Is of more worth than a thousand kinsmen.
Euripides.
7. Better to hunt in fields for health unbought
Than fee the doctor for a nauseous draught.
The wise for cure on exercise depend;
God never made his work for man to mend.
Dryden.
8. Cleanness of body was ever esteemed to pro-
ceed from a due reverence to God, to society,
and to ourselves.
Bacon.
9. In rigorous hours, when down the iron lane
The redbreast looks in vain
For hips and haws,
Lo, shining flowers upon my window-pane
The silver pencil of the winter draws.
Stevenson.
10. Now, good digestion wait on appetite,
And health on both.
Shakespeare.
11. For strength to bear is found in duty done,
And he is blest indeed who learns to make
The joy of others cure his own heartache.
Drake
12. Example is the school of mankind, and they
will learn at no other.
Burke.
13. Old Winter is a sturdy one,
And lasting stuff he's made of;
His flesh is firm as ironstone,
There's nothing he's afraid of.
German Song.
14. Health is the second blessing that we mortals
are capable of—a blessing that money can-
not buy.
Walton.
In nothing do men more nearly approach the
gods than in giving health to men.
Cicero.
15. He prayeth best who loveth best
All things both great and small;
For the dear God who loveth us,
He made and loveth all.
Coleridge.
16. Heaven to me's a fair blue stretch of sky;
Earth's jest a dusty road.
Masefield.
17. For want of a nail the shoe was lost; for want
of a shoe the horse was lost; for want of a
horse the rider was lost.
Franklin.
18. God grants liberty only to those who love it,
and are always ready to guard and defend it.
Webster.
'Tis liberty alone that gives the flower of
fleeing life its luster and perfume; and we
are weeds without it.
Cowper.
19. These winter nights, against my window-pane
Nature with busy pencil draws designs
Of ferns and blossoms and fine spray of pines,
Oak-leaf and acorn and fantastic vines,
Which she will make when summer comes
again.
Aldrich.
20. Cleanliness is indeed next to godliness.
Wesley.
21. Nor love, nor honour, wealth nor pow'r
Can give the heart a cheerful hour
When health is lost.
Gay.
22. Some books are to be tasted, others to be
swallowed, and some few to be chewed and
digested.
Bacon.
The place that does contain
My books, the best companions, is to me
A glorious court, where hourly I converse
With the old sages and philosophers.
Beaumont and Fletcher.
23. I block the roads and drift the fields with snow,
I chase the wild-fowl from the frozen fen;
My frosts congeal the rivers in their flow,
My fires light up the hearths and hearts of
men.
Longfellow.
24. No one is useless in the world who lightens the
burden of it for anyone else.
Dickens.
25. A prince can mak a belted knight,
A marquis, duke, and a' that;
But an honest man's aboon his might,
Guid faith, he maunna fa' that.
Burns.
26. E'en from the body's purity, the mind
Receives a secret, sympathetic aid.
Thomson.
27. It is more blessed to give than to receive.
Bible.
28. Ah, may I be as cheerful
As yonder winter birds,
Through ills and petty crosses,
With no repining words.
Cooper.
29. Keep clean, be as fruit, earn life, and watch
Till the white-winged reapers come.
Vaughan.
30. I strove with none, for none was worth my
strife;
Nature I loved, and next to Nature, Art.
I warm'd both hands against the fire of life,
It sinks, and I am ready to depart.
Landor.
31. It is not growing like a tree
In bulk, doth make man better be,—
In small proportions we just beauties see,
And in short measures, life may perfect be.
Jonson.
There's no dearth of kindness
In this world of ours;
Only in our blindness
We gather thorns for flowers.
Massey.



A Torii Gate. Such a fantastic structure is usually placed before the entrance to some sacred place, and also is seen in harbors and waterways. It is a superstition of Japanese sailors that fair weather and success will attend them on a voyage if their craft is sailed beneath the lintels of the torii. Only very small boats can actually pass through the gate.



The STORY of JAPAN

JAPAN. This island-empire, lying in the Eastern Pacific Ocean, has risen in less than one century from complete obscurity to the position of a world power, with a facility which is one of the miracles of modern times. It is called by its own people NIPPON, or "the origin of the sun," for the continent of Asia to the west sees the sun emerge, apparently, from the myriad islands of Japan. "Myriad" is an accurate and not a mere poetic term here, for there are about four thousand islands in the empire. Most of them are tiny—mere shrubby-grown rocks which rise steeply out of the ocean; and fewer than one-eighth of them are inhabited or have a coast line of more than two and one-half miles.

Like China, its neighbor to the west, Japan has spent all but the latest century of its existence shut up within itself, rejecting progress, resisting every advance of the Western nations; to them it was an impenetrable but fascinating mystery. Like the other countries of the Orient, it found a place in the hazy geography of the Middle Ages, and the heart of Europe coveted this land of rare beauty and the countless riches that were believed to exist within its borders. *Cipango* it was called by Europeans, and explorers sought for its shores; and to the day of his death, Columbus thought that he had reached, not a new world with its wealth all undeveloped, but *Cipango* the marvelous, the long-sought-for.

To-day, Oriental mystery and splendor constitute the charm of India and Egypt for the average reader; the magic of Japan is its beauty. Japan's dainty women, its cherry blossoms, wistaria, and chrysanthemums; its picturesque temples, its artistically bridged streams, and, above all, its famous sacred mountain of Fujiyama—all of these make more remarkable the fact that this nation of

little people, beauty-loving, suave, and gentle, should have placed itself so quickly among the world's great military and naval powers after its interest was awakened.

Location, Size, and Population. The islands which compose this important empire of the Pacific form a chain about 2,400 miles in length



LOCATION MAP

The lower half of Sakhalin Island, Chosen (Korea), and Formosa are now parts of the empire.

along the coast of Asia. Stretched along the Atlantic coast of North America, this long chain would extend from Cuba to Labrador. Japan proper consists of four islands separated from the continent by the Sea of Japan and the Strait of Korea. These are Hondo,

or Honshu, the largest and most important, Hokkaido, Shikoku, and Kiushu. To the north are the Kuriles, a scattered group of small islands owned by Japan, which also possesses half of the island of Sakhalin, to the west of the Kuriles. Japanese Sakhalin is also known as Karafuto. The slender thread of the fifty-five Loo-Choo Islands reaches southward to Formosa, or Taiwan, divided from China by the Formosa Channel. Korea, annexed in 1910, and renamed Chosen, is part of the Asiatic mainland. The Pescadores, islands off the Formosa coast, and the Bonin Islands, about 600 miles southeast of Tokyo, also belong to Japan. The islands of the Pacific which were German before the World War are now Japan's, with the exception of

Yap (which see), under mandate of the League of Nations.

The estimated area, exclusive of Korea, but including Taiwan, is a little more than 175,000 square miles. The total population, also excluding Korea (see CHosen in these volumes), is almost 64,000,000, more than half that of the entire United States and nearly seven times that of the Dominion of Canada. The figures include the population of Taiwan, which is about 4,000,000. Japan is one of the most densely populated countries in the world, with an average of more than 350 persons per square mile. The number of foreigners residing in Japan exceeds 35,000 and the majority of them are Chinese. The average annual net increase in population is 755,000.

The People and Their Cities

Their Characteristics. The Japanese are a mixture of several racial types, and are shorter in stature than Koreans or Chinese. The average height of Japanese men is five feet six inches; that of women, four feet ten inches. Not only are they shorter than Europeans, but they are distinguished by the shape of the eye, the prominence of the cheek bone (a characteristic of the peasant classes rather than the nobility), and the very slight growth of straight black hair on face and body.

The physical development of the Japanese is remarkable; short of stature and slightly built, they depend for their strength upon agility and suppleness of body, dexterity, and endurance. They have perfected the efficient modern system of self-defense known as *jūjutsu* (which see).

The amazing facility with which the Japanese have assimilated Western civilization is a witness to their keen intelligence, equal to that of any other people; to their unexcelled powers of adaptation; and to their combined faculties for accomplishing great things and for mastering infinite detail.

These qualities, as well as courage and quick wit, are evident from knowledge of their social and economic progress. A personal observation reveals qualities just as remarkable. Their outstanding characteristic is gaiety of heart. They are a laughter-loving people, schooling themselves to be undisturbed by the petty annoyances of life. They live amid natural beauty, and their exquisite sense of the beautiful and artistic is part of all life, appearing in their costumes, houses, gardens, and festivals. Generations of adherence to a strict and minute social etiquette have made them the most polite of people. So keen is their sense of courtesy that even personal depression or loss must be hidden from others. Japanese do not customarily shake hands, but

bowing is a form of greeting, varying in elaborateness with rank and sex.

A large population and limited means of support have made the qualities of frugality and endurance inborn in the Japanese, just as generations of military authority made obedience almost instinctive. Their love of children is a marked characteristic, and Japan has been called a "paradise for children." None more happy, delightful, and polite can be found, and their welfare is the most important concern of every home.

Mode of Life. Western construction methods are popular in cities, but they have not replaced the apparently unsubstantial structure which is the average Japanese home. It is usually of one story, except in the cities, is built of wood, and has sliding screens of paper instead of windows, doors, and partitions, the outer ones backed by wooden shutters. On the floor are straw mats, and that these be thick and soft is a necessity, for, covered by thick quilts which are carefully folded away during the day, they constitute the sleeping place for the family. Since shoes must be removed on the porch, these mats do not get dirty, as do the rugs in our homes. Beds, chairs, and draperies there are not, nor are there any tables except the low lacquered stands on which the food is served. Desks for reading and writing, however, are common. When heat is needed, it is provided by a *hibachi* of burning charcoal. Rice is the staple food, and with it is served fish, seaweed, meat, eggs, beans, or something else to give it flavor, or perhaps only the sauce made from soy beans. Tea is used everywhere, and the common fermented drink, made from rice, is called *sake*. Knives and forks are sometimes used, but they have not replaced the familiar chopsticks.

The Western mode of dress is used at the Imperial Court, in the army and navy, and



Photos: O R O C; U & U

Some Social Aspects. Above, a study in delightful native costumes, which unfortunately for the cause of art, are gradually being replaced by Western dress. Center, a fine example of a Japanese parlor. The motto reads, "Keep your soul as clear as the mirror, and respect others as you wish to be respected." Below, a ceremonial tea.

in those groups which have most contact with Western customs. The loose robe, which Westerners have adopted for negligée and know as the *kimono*, is still, however, the most common dress of the people. It ranges in kind from cheap coarse cotton to costly embroidered silk; the Japanese woman confines her robe with a silken girdle called the *obi*. The *obi* is often of very expensive design, costing as much as \$300. It is eight feet long, and from twelve to fifteen inches wide.

Education. The present system of education is not an outgrowth of the old native systems, modeled after the Chinese, but has been worked out according to European and American models; and for a long time after Japan opened its doors to Western influence, there was a constant call for educated foreigners who could assist in building up a system. To-day, elementary education is compulsory, and free for each child over six years of age. There are kindergartens, elementary and middle schools, normal schools, and technical and special schools. The seven Imperial universities are at Tokyo, Sendai, Fukuoka, Sapporo, Taihoku, Kyoto, and Seoul, and there are twenty-one other institutions of university rank. The island of Taiwan has a special system of elementary education.

One decided sign of the progress of Japan within the last few decades has been the growing care for the education of girls, who receive the same instruction as the boys and are as well represented in the schools. Ninety-nine per cent of the boys and girls of school age are being taught. Considerable help toward such progress has been given by the mission schools.

Religion. Japan has absolute religious freedom, and there is no state religion. Many of

the upper classes are agnostics. The oldest, and native, religion is known as *Shinto* (the way of the gods). It has more than a dozen sects, and 63,200 shrines, although it has no creed, no moral code, and no temple images. It is a sort of ancestor and nature worship which peoples the world with innumerable deities, chief of whom is the sun goddess, from whom the mikados, or emperors, are supposed to be descended. Shintoism has scarcely any services except occasional celebrations.

Buddhism, with its rituals, its priests, and

its gorgeous temples, has persisted in Japan since the sixth Christian century. The majority of the people are Buddhists; many are both Shintoists and Buddhists. Buddha's temples number 70,000, and his priests, 100,000. Buddhism and Shintoism make Japan a land of shrines and temples, many of them of surpassing beauty.

Christianity has made remarkable progress; the number of Christians is estimated at more than 215,000.

Language and Literature. Japanese is not related to neighboring tongues, except vaguely to the Korean language, and is considered by scholars

a member of the Ural-Altaic group. The adoption of Chinese civilization in the first Christian century included the adoption of many Chinese words, now changed in pronunciation and use. Japanese is an inflected language, but not strongly so. In writing Japanese, the ideographs, or modified picture-writings, of China are used. Chinese has only monosyllables, while Japanese has many polysyllables; this characteristic made it necessary to simplify the writing to fit the Japanese tongue. The writing of Japanese requires skill and long practice, and Japanese youths must study it for years; it is usually done with the paper held in the left hand, and the



Photo. Keystone

SWEET DREAMS ON A BLOCK OF WOOD

The native Japanese spread their beds on the floor, in the manner shown, and remove them in the morning. Only a small pillow is placed on the block, which is curved to fit the contour of the head. Note the artistic simplicity of the furnishings in the room.

picture is made with a pen, which has displaced the brush of former days. A foreigner who learns the language has the difficult task of learning an ordinary colloquial speech, a differing polite colloquial, and the written form. The adoption of the Roman alphabet has been frequently urged.

Chinese characters are more convenient for the expression of new words and scientific terms than Japanese characters, and most of the books on serious or technical subjects make use of the former, while the latter are often used in pure literature, such as poetry, the drama, and the essay. A foreign language often used in commerce is English; its study

had their origin in religious ceremonies; history; geography; and scientific works. Most of the latter have been produced since 1854, following the influx of Western civilization. Now



NOT A SCENE FROM FAIRYLAND

A bit of Japan, showing a temple mirrored in a small lake.

in secondary schools is required. Many English words are used in conjunction with the Japanese language.

Just as Japanese civilization was profoundly influenced by the Chinese, so the Chinese classics became the model for Japanese literature. This literature includes poetry, which is highly praised; stories; plays, most of which



Photo U & U

HOW THEY BREAK THE BAD NEWS

The manner of presenting a check for a meal in a fashionable Japanese restaurant is entirely different from the method employed in the night clubs of America. The waitress, bearing a handsome lacquer box, falls on her knees before the customer, and bowing her head to the floor, presents him with the box, which contains his bill.

the country produces an enormous volume of books and newspapers, and the European and American influence, particularly that of the Russian novelists, has greatly increased the amount.

The Japanese art of acquiring another civilization, and adapting it without losing anything of the spirit of Japan, is shown as remarkably in this realm of literature as in any other field; nothing of the essential Japanese character seems to be lost through the influence of other countries.

Art. The phrase *Japanese art* brings up mental pictures of exquisite pottery ware, gleaming lacquers, embroidered silks, enamels, finely wrought mosaics, and pictures remarkable for their ability to produce a clear effect with a few simple lines. The Japanese as a people are remarkably artistic, and the simple, unfurnished rooms of their houses are always ornamented with pictures, either hanging on the wall or executed directly upon the sliding screens. Most of the pictures are unframed, all of them are unglazed, and the material



JAPANESE ART

A falcon, from the painting by Hokusai.

upon which they are made must thus be some fairly durable substance, as silk. Japanese pictures ignore perspective entirely; they show no softening shadow effects, but, on the other hand, they display a remarkable genius for composition, a fine sense of the harmony of color, and a knowledge of everything that a line can be made to express. The mountain of Fujiyama is a favorite subject or background for Japanese pictures, not only because it is sacred, but also because it has such perfection of form and beauty.

In the other fine arts, Japan does not excel, but many of its mechanical arts are unsurpassed elsewhere. The crackled Satsuma ware; the cloisonné enamels; the ivory carvings; the gold-decorated lacquer; the pictures done in embroidery—these the workmen of other lands would find it impossible to duplicate, and much of Japan's export to Western countries consists of such articles. See *Manufacturing*, below.

The Cities. Nearly thirty per cent of Japan's population is urban. The principal cities are situated on the excellent harbors of Hondo or on the neighboring islands. Tokyo, the capital, and Yokohama are described in these volumes under their respec-



Scene from a drama, painted by Shunsho.

tive titles. The remaining cities of note are the following:

Kobe, *ko' be*, on the southern coast of the island of Hondo, is a seaport of the first importance. Its trade has considerably increased as a result of the earthquake of 1923, which destroyed the larger nearby port, Yokohama. It has excellent railway facilities and a good harbor, which is being consistently improved; several shipbuilding yards are situated at Kobe. It is connected with Osaka by electric railway. An earthquake shock in 1925 caused much damage and some loss of life. A Christian college for Japanese women is located at Kobe. Population, 1925, 644,212.

Kyoto, or **Kioto**, *kyo' toh*, the ancient sacred capital of Japan, situated on the island of Hondo, 230 miles southwest of Tokyo. The center of the Buddhist faith and for a thousand years the capital of the empire, Kyoto is a city of temples, monuments, and Buddhist monasteries. The Imperial Palace covers more than twenty-five acres. The embroideries, enamels, and inlaid bronze work of Kyoto, and its pottery, porcelain, ivory and bronze ornaments, and velvets and brocades are famed throughout the world. The city declined in importance as Tokyo, grew, and in 1868 the capital was removed to the greater city. Kyoto contains one of the Imperial universities, founded in 1875, which now has more than 2,000 students. Population, 1925, 679,968.

Nagasaki, *nah ga sah' ke*, a seaport on the northwestern coast of the island of Kiushiu, almost oppo-



Photo: U & U

IMPRESSIVE VIEW OF SACRED FUJIYAMA

site the city of Shanghai on the Chinese coast. It is the country's fourth port in respect to commerce. Its harbor, one of the most beautiful in the world and one of the safest in the eastern hemisphere, is about three miles long and six miles wide; its climate makes it a favorite health resort. The city figures largely in the shipbuilding industry, and is an important coaling station, owing to the near-by coal mines. For many years preceding 1858, Nagasaki was the only Japanese port having communication with Europe. The city is noted for its festivals and temples, among the latter the famous Shinto "Bronze Horse" temple. Population, 1925, 189,071.

Nagoya, *nah go' yah*, best known as one of the great centers of the pottery trade, is situated near the head of Ise Bay, on the island of Hondo, 235 miles southwest of Tokyo and ninety-four miles northeast of Kyoto. The first glazed pottery produced in Japan was made in the thirteenth century by Kato Shirozaemon, at Seto, thirteen miles from Nagoya, and all the products of the great potteries of Seto are taken to Nagoya for sale or export. Nagoya is a modern industrial city; nearly the entire population is engaged in the pottery industry, and the city has also large cotton, silk, and embroidery factories. The city is noted for its cloisonné enamels.

The castle of Nagoya, erected in 1610, and now used as a military depot, is one of the wonders of Japan. Population, 1925, 768,558.

Osaka, or **Ozaka**, *o zah' kah*, the largest city in Japan and third in importance as a port, is the leading manufacturing city and a commercial center for internal trade. It is situated on the island of Hondo, on the Yodo River, and on the shore of Osaka Bay, seven miles southwest of Kyoto, and twenty miles southeast of Kobe. The latter city, until the recent completion of Osaka's deep-water harbor, was the port for its extensive manufactures. The city has in all over 7,000 factories; it is the center of the cotton manufacture, but has also shipyards, iron works, sugar refineries, silk mills, and porcelain and glassware works. Osaka is intersected by canals and spanned by numerous bridges, which have given it the name of the *Venice of the East*. It possesses a famous castle, many temples and places of amusement, an excellent university, public playgrounds, modern buildings, and a fine government mint. One newspaper, *Asahi*, has a circulation of about 2,000,000 per day. Population, with suburbs annexed in 1925, 2,114,804. (Its population was materially increased by refugees from the earthquake of 1923.)

Physical Features

Surface. Much of the charm of the delightful islands of Japan is due to the irregular surface, with its luxurious vegetation. The country is very mountainous, with a main range following the crescent-shaped curve of the principal islands. Hondo, the largest, which is 700 miles in length, is traversed from end to end by this range, and only in the neighborhood of Tokyo is there a plain of any considerable extent. Smaller ranges cross this main one, breaking it into deep valleys and small plains. Smaller branching ranges run down to the sea, forming larger harbors and affording the most beautiful scenery of the empire. For the most part, mountains and valleys are covered with trees and shrubs. Climate and volcanic action have smoothed out the ruggedness of the mountains, and the country gives an impression of gentle beauty rather than grandeur.

Japan is of volcanic origin and its volcanoes are said to number more than 150. While most of them are considered extinct, some still send out steam and occasional lava flows, while infrequently one breaks forth and does serious damage (see *History*, below).

The highest peak in the empire is Mount Niitaka (Morrison), in Taiwan, 14,500 feet in height, but the most famous is Fujiyama, "the Peerless," the highest in Japan proper. This majestic mountain, lifting its white symmetrical cone from the level plain of Hondo to a height of more than 12,000 feet, can be seen from far out at sea. It is easy of ascent, and since it is regarded as sacred, is visited by thousands of pilgrims each year.

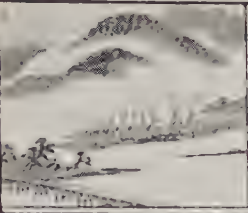
Waters. These narrow islands, everywhere ridged with mountains, give small opportunity

for rivers of any great size, but the streams are numerous and picturesque. Down every valley rushes a little river, and myriads of waterfalls add to the charm of the scenery. In the island of Hokkaido is the largest river, the Ishikari, which has a course of 275 miles, while Hondo has three rivers of note, the Shinano, the Tonegawa, and the Kisogawa. Even after these streams reach level ground, they are so impeded by shallows and rapids that only broad, flat-bottomed boats can navigate them. These rivers carry quantities of water seaward during the rainy season or in the spring, but at other times of year dwindle to small brooks.

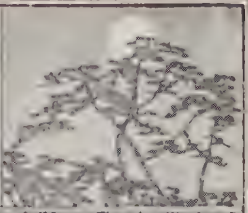
Japan has many beautiful lakes in its mountain regions, attracting thousands of tourists. Most famous of all is Lake Biwa, in the province of Omi, in the south-central part of Hondo. This lake is almost equal to the famous Swiss lake, Geneva, in size, and is noted for its famous "eight views of Omi." In the region of the lakes there are hundreds of hot springs, whose mineral waters have medicinal and curative properties.

Earthquakes. Earthquakes are more than daily occurrences in Japan; there are about 2,000 each year, but most of them are perceptible only with delicate instruments. However, several severe shocks are felt each year, while disastrous earthquakes are suffered at longer intervals. The most devastating in Japan's history was that of 1923 (see *History*, below).

The Pacific shore is more subject to severe shocks than the western shore. This condition is thought by geologists to be due to



JAPAN



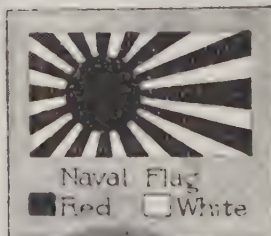

Jimmiksha Service
disappearing
in the
cities



EMPIRE
OF
JAPAN



The Great Buddha



Geisha Girls



A Young
Mother



disturbances in the ocean floor, which, directly off this side of the islands, descends to a depth of more than 4,000 fathoms. The region is called the Tuscarora Deep.

Climate. By reason of its great north-and-south extent, Japan has a climate that varies widely in the different parts of the empire.



Photo: Wide World

A MOVING-PICTURE STAR

Miss Sumiko Kurishima, the Mary Pickford of Japan, in an important picture wore a headdress fit for a queen.

In Taiwan and the Loo-Choo group, sub-tropic conditions prevail; snow never falls, and the summers are long and very hot. But far to the north, in Sakhalin and the Kurile Islands, the winter cold is almost Arctic in its intensity, and snow lies in the hollows the year round. In the central part of the empire, near the capital, the climate is equable and for the most part delightful, though a brief period in summer is likely to be very hot and humid (see JAPAN CURRENT). Indeed, an excess of moisture is one of the chief characteristics of the climate as a whole, and fogs are frequent.

The average annual rainfall is heavy, practically every part of the empire having more than fifty inches; but as much of this does not fall during the growing season, irrigation is necessary at times. The islands are subject to fierce cyclonic storms of rain and wind called typhoons, which do great damage, both

during their course and by reason of the flooding of the rivers afterward. These storms are most numerous in autumn.

Flora. Forests cover a large area, and autumn brings gorgeous color to vary the rich green of mountain and valley. Except in the far north, vegetation is especially luxuriant, owing to the warm climate and the excessive moisture, and it constitutes the chief beauty of Japan. The people love flowers, for centuries have cultivated them carefully, and have special festivals at periods when the land is abloom with some favorite blossom. In February come the plum flowers; two months later the cherry, the "soul of Japan," and visitors to Japan are fond of timing their trips so that they may reach the country during cherry-blossom time. Next comes the exquisite wistaria, then the azalea, the iris, and the peony; this last regarded with a special affection; and then, in November, comes the crowning glory of the year, the gorgeous chrysanthemum, which Japanese gardeners have brought to a high state of perfection, and which has become the national flower.

The wide range of climate permits almost every sort of tree to flourish in some part of the islands. Especially characteristic of Japan are the Japanese cedars and the maidenhair trees, many of which are found in temple grounds. Many beautiful plants are also commercially valuable—the tea shrubs, the varieties of mulberry tree useful for paper-making and food for silkworms, the fire cypress, the Japanese elm, and that most graceful of

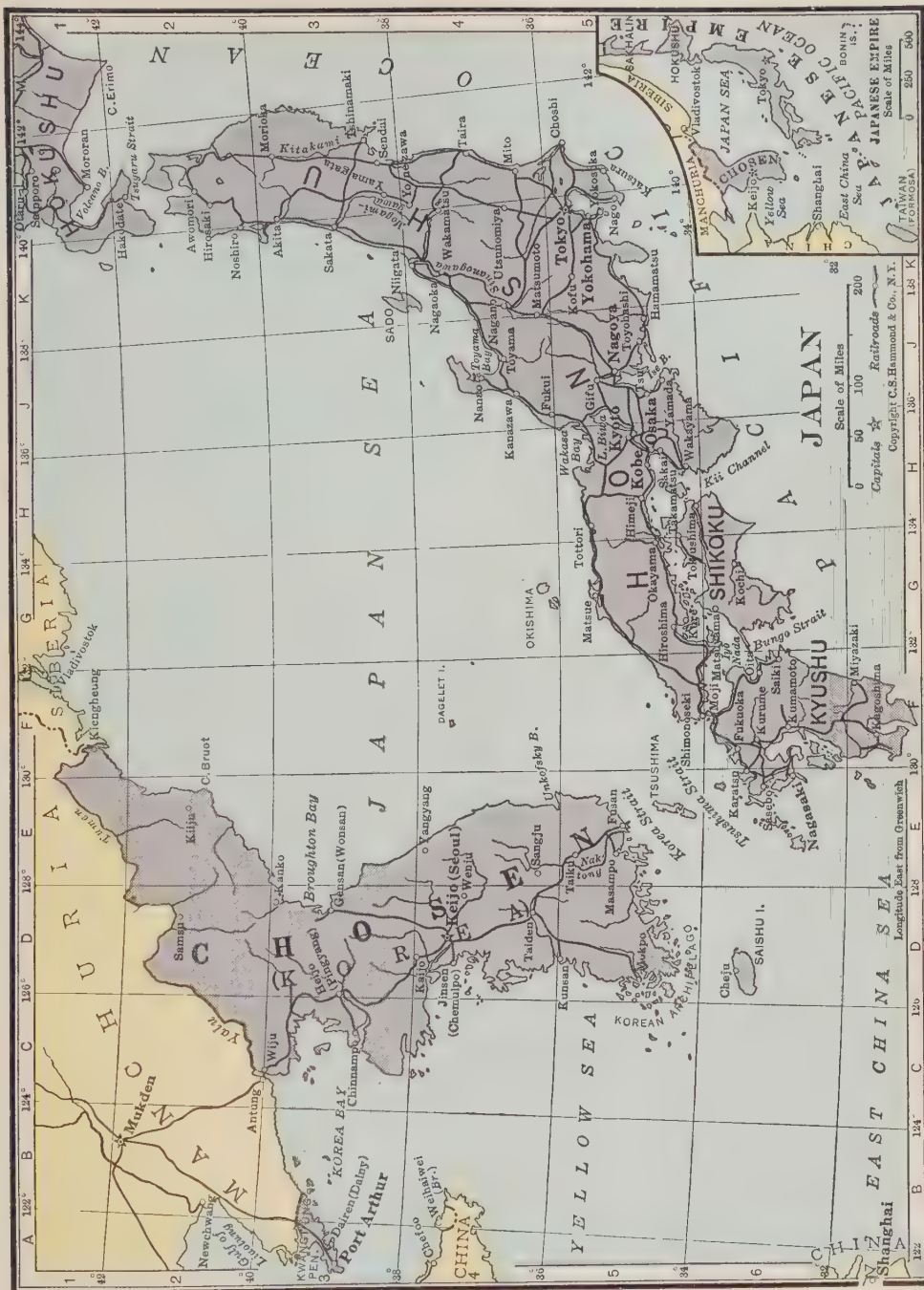


THE RING OF FIRE

The path of earthquakes around the shores of the greatest of oceans.

plants, the bamboo. The sap of the lacquer tree of Northern Japan is used for the famous lacquer ware; the camphor tree of Taiwan is also valuable, and its culture is a government monopoly.

Fauna. An unusual number of animals are native to the islands, among them monkeys, black bears, the brown "grizzlies" of North



See page xvi, facing text page i.

How to Read a Map:

Engraved and printed expressly for THE WORLD BOOK

JAPAN

Akita, 36,294.....	L 3	Iyo Nada (sound).....	G 6	Mogami-gawa River.....	L 3	Sinanogawa River.....	K 4
Awamori, 47,206.....	L 2	Japan Sea.....	G 3	Moji, 55,682.....	F 6	Taiden.....	D 4
Biwa Lake.....	J 5	Jinsen (Chemulpo),		Mokpo.....	D 5	Taiku.....	E 5
Bonin Islands, 3,595.....	L 7	25,167.....	D 4	Morioka, 36,012.....	L 3	Taira, 5,823.....	L 4
Broughton Bay.....	F 3	Kagoshima, 63,640.....	F 7	Mororan, 20,335.....	L 1	Taiwan (Formosa),	
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COMING HOME FROM THE TEA FIELDS



Photos: Keystone

A TYPICAL MOUNTAIN HUT

America, and bats. Badgers and foxes play important parts in native folk tales. Domestic animals are the ox, pig, and fine horses.

Many birds of temperate regions are common to Japan, although singing birds are few.

The sweetest songbird is the *uguisu*, the Japanese nightingale. Naturally, water birds are plentiful, and the crane and the heron have been common subjects for Japanese artists.

Industries and Commerce

Mining. In the seventeenth and eighteenth centuries, when the European nations were making first acquaintance with Japan, it was gold and silver which they coveted, and they carried away with them millions of pounds of these precious metals. To-day the supply of both is comparatively small. In fact, the country is practically without metals.

Coal, chiefly bituminous, is mined in large quantities in Hokkaido, Taiwan, and Kiushu, and a surplus is exported. The mines of Kiushu have made the port of Nagasaki one of the chief coaling stations of the Pacific. The output of iron, however, is negligible; iron and steel have been imported in large quantities to meet the requirements of industrial development.

Sulphur is mined from volcanic deposits. Petroleum is found throughout the islands, but in very limited quantities; it is imported to meet the increasing demands.

Fisheries. The vast seas surrounding the island-empire furnish the Japanese with one of their chief articles of diet—fish of every sort. It is estimated that nearly 2,000,000 persons are engaged in some manner in the fishing industry, and that at least 400 products of the sea appear on Japanese tables. The government has taken an active part in promoting the fishing industry, by subsidizing fishing ships and by supporting fish hatcheries. The latter are largely used for salmon, which

were greatly reduced in number by unrestricted catching. Bonito, sardines, tai, and herring are the most important in quantity. Fish products are exported, especially to China, and goldfish for decoration are propagated in quantity. Fish oil is an important product. The salt used for preserving fish is evaporated from sea water, an industry reaching an extent of more than a billion pounds in a year. Canned crab is exported to the United States in amounts valued at more than \$5,000,000 a year. The use of fish for fertilizer is extensive, and the residue from the industry of making fish oil furnishes an important part of this product.

Agriculture. As fish is the chief animal food, so rice is the chief vegetable. One of the most characteristic sights in all Japan is its rice fields, or paddy fields, often on wide terraced hillsides where water is available. Wherever the land can be irrigated, it is divided by ridges of grass into little muddy plots, and in these the rice is planted. Ditches, divided and subdivided until they are but tiny trickles, supply the necessary water, for the paddy fields are kept flooded until just before harvest time. Rice land must be flat and irrigable, and the scarcity of usable land has therefore caused the terracing of the smallest valleys. These tiny farms with their neatly terraced fields make vivid impressions upon visitors to Japan. On the upward slopes

from the plains grow tea, tobacco, cotton, and sugar, and in the cooler regions, soy beans, peas, potatoes, wheat, and barley. Mulberry trees are grown extensively for the culture of the silkworm. In some parts of the empire fruits are produced, but except for the big Japanese persimmon and the mandarin orange, they do not thrive especially well.

As in other countries, the World War drew many people from the farms to the industrial centers, and in the industrial depression after the war, only a small portion of that number returned to agriculture. While rice production remains as the staple, exceeding by half the production of rye, wheat, and barley, the growth of cotton, hemp, and indigo was reduced.

More than fifty per cent of the people are on farms, while only about fifteen per cent of the land is arable (13,990,000 acres, to be exact). Since the farms are so small, intensive cultivation and scientific methods are necessary. The government has spent large sums on schools of agriculture, experiment stations, and agricultural exhibitions; reapportionment of farms and better methods of irrigation are encouraged, and loan banks for farmers have been established. However, taxes are high, and families are usually compelled to supplement agriculture with some home industry, such as fishing, the manufacture of straw mats, or the raising of silkworms. Rural reorganization is now an important economic problem.

It is but recently that stock-raising has received much attention, and only now are the Japanese beginning to be well acquainted with butter, milk, cheese, and beef as articles of food. Even to-day, the stock and dairy industries are of very minor importance, despite the interest which the government has shown in them, and a wider knowledge of the proved benefits of diversified diet.

Manufacturing. Japan is an important modern nation industrially, but retains its historic manufactures, unrivaled by those of any other country. Smooth lacquer, delicately turned pottery, and the intricacies of carved ivory and of decorated bronze and enamel are evidences of the artistic appreciation which is the heritage of the humblest artisan. In most cases, the finest of these are products of home industries. Unfortunately, Western trade has demanded quantity production; in most cases, this has resulted in objects inartistic in design and inferior in quality, because foreigners refused to pay high prices for superior articles.

One of the products which so far has not been successfully imitated is Japanese paper, made from the paper mulberry. It is used for room partitions, windowpanes, handkerchiefs, and, when treated with wax, for waterproof clothing.

Side by side with these centuries-old home industries are the modern factories of Western civilization. Spinning and weaving, once home industries, are now the work of these factories. The great mills use more than a million bales of Indian cotton yearly, as well as nearly a million and a half bales of the more expensive American cotton. Cotton manufacturing holds first place; it supplies domestic needs, and a surplus for export to China, India, Java, Straits Settlements, and South Africa. Requirements of raw cotton exceed \$363,000,000 per year. The spinning and weaving of silk are next in importance, and the skill of Japanese women in the work will maintain the prestige of Japan in this industry. Much of the silk is employed for home use, but Japan furnishes about sixty per cent of the world's supply of raw silk. The value of this export to the United States alone is over \$350,000,000 yearly. Since 1914 the imports of goods to the United States from Japan have increased from about \$85,000,000 to more than \$400,000,000 per year; the exports to Japan from the United States, from \$45,290,000 to nearly \$260,000,000.

The rapid growth of manufacturing has called for great supplies of iron, steel, and machinery. More than 250 iron foundries were opened during the World War, and there are 6,000 factories engaged in making machinery and tools. For all of this output, iron and steel must be imported. Electrical supplies, chemicals and dyestuffs, European printing paper, matches, oil, and straw braid are important manufactures.

All of the evils which accompany an industrial revolution have been present in Japan—bad housing and working conditions, crowding in cities, long hours and low wages for both men and women, and child labor. The country has made very great progress toward the elimination of these evils. The rapid introduction of Western methods also resulted at first in the production of articles much inferior to Western products, but the quality of such articles is being steadily improved.

The possibilities of hydroelectric power, so abundant in the short, swift streams and waterfalls, have been realized only in slight degree.

Transportation and Commerce. No part of Japan is a great distance from either the Sea of Japan, the Pacific Ocean, or the beautiful Inland Sea, between the islands. For this reason, and because the surface of the islands is rough, water communication is the most common form. The government makes every effort to facilitate communication within the country and to foreign lands. Harbors have been deepened and improved, and subsidies have been granted to vessels in the foreign trade. The Panama Canal aided greatly in



Photos: Wide World; P & A

The Earthquake and Fire. In the large square above, refugees are jammed in a Tokyo square; the flames surrounded them, and most of them died. Small inset, sleeping in a water main, at the moment their only home. Below, complete destruction of a cotton mill, where hundreds died.

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establishing steamship lines to the Eastern United States and Eastern South America.

Since 1872, when an eighteen-mile railway connecting Tokyo and Yokohama was built, Japan has developed a railway mileage of more than 11,000, and the government operates more than three-fourths of it. This includes the railways in Manchuria and Mongolia (694 miles), which China conceded the right to build. A seven-mile railway tunnel under the strait between the islands of Hondo and Kiushu, one mile of which is completely under the sea, was completed in 1928. A plan for complete electrification of the railroads has been begun. The gauge of the railroads is three feet six inches.

While modern pavements, trolleys, and motor cars make transportation in the cities

like that of any modern European or American city, much improvement yet remains to be made in country districts, particularly in roads. The 'rikisha (see JINRIKISHA), a light, two-wheeled carriage drawn by a man, is still in use, but is disappearing very rapidly in the large cities, owing to the hazards of high-powered automobiles.

Japan has developed a large merchant marine, and its ships may be seen in all of the great ports of the Pacific. The chief exports are silk, cotton, textiles, tea, camphor, rice, sea products, and the various articles of home manufacture. Most of the countries of the world are represented in its commerce, with the United States its best customer. Japan imports chiefly cotton, textiles, iron and steel, sugar, rice, and petroleum.

Government and History

Government. The constitution of 1889, patterned on that of Germany, makes of Japan a constitutional monarchy, with the hereditary emperor as the head. To-day, only foreigners use the poetic term "mikado" as a name for the ruler. He must approve every legislative measure before it becomes a law; he appoints all civil and military officers, and is commander in chief of the army and navy. He can declare war, make peace, and conclude treaties; the members of the Privy Council act as his counselors on important state matters. There is a Cabinet, made up of the ministers of the eleven departments and the Prime Minister, who are appointed by the emperor; there is also an Imperial Diet, or legislature, of two houses. The emperor may convoke or close the Diet, which meets annually.

The upper of these houses, the House of Peers, is composed of princes, marquises, and a certain number of the lower nobles, together with various "commoners"; the latter are chosen by the emperor for special service rendered, or, in some cases, because they pay very high taxes. This house numbers about 400 members. Members of the House of Representatives, 466 in number, are chosen by popular vote. Until 1925, suffrage was restricted, in the elections for representatives, to those who paid a specified amount in taxes, but in that year, general manhood suffrage was enacted, to come into effect at the first general election. This was held in 1928.

For local government, the empire is divided into prefectures, which in turn are divided into municipalities, towns, and villages. Election to the municipal, town, or village assembly is open to any male citizen. The trend of the government is toward democracy and party government. The currency of Japan is on a gold basis, with the yen (about fifty

cents) as the standard. Military service is universal and compulsory. Chosen and Taiwan are each under a governor-general.

Early History. The very early days of Japan are as hazy as are its own landscapes in the foggy season. Here and there a figure looms, as Emperor Jimmo, who is supposed to have founded the present reigning dynasty in 660 B.C.; but the outlines are not distinct, and the mist soon settles down again. The history after A.D. 500 may be stated more definitely, the first certain event, in 652, being the arrival of Buddhist missionaries from Korea; the next, the opening up of that intercourse with China which resulted in the acceptance of Chinese standards and Chinese civilization. The centuries that followed saw a marked growth in culture, and especially a centralization of the government. In these early years, too, began that seclusion of the emperor which until very recent times served to make him in the eyes of his people a sort of divine mystery, revered, but not loved.

The Middle Age. This was for the most part a period of civil strife, lasting from the twelfth to the seventeenth century. The military caste became very strong, and the chief general, or *shogun*, gained a power which was far greater than that of the emperor. In time, the mikado became almost a myth, and it was the able shogun Iyeyasu who, in the early seventeenth century, restored a measure of tranquillity to the strife-torn country. He distributed the land among feudal chiefs, or *daimios*, whom he trusted, and by his power stabilized that feudal routine from which Japan did not emerge until the middle of the nineteenth century. The country was divided into distinct classes: the nobility; the shogun and his feudal chiefs; their military forces, called *samurai*; and the *heimin*, or despised



Reconstructed Tokyo. After the earthquake and fire of September, 1923, rebuilding operations were begun at once. Above is shown a view of Ginza, one of the city's most important thoroughfares, as it appears to-day.

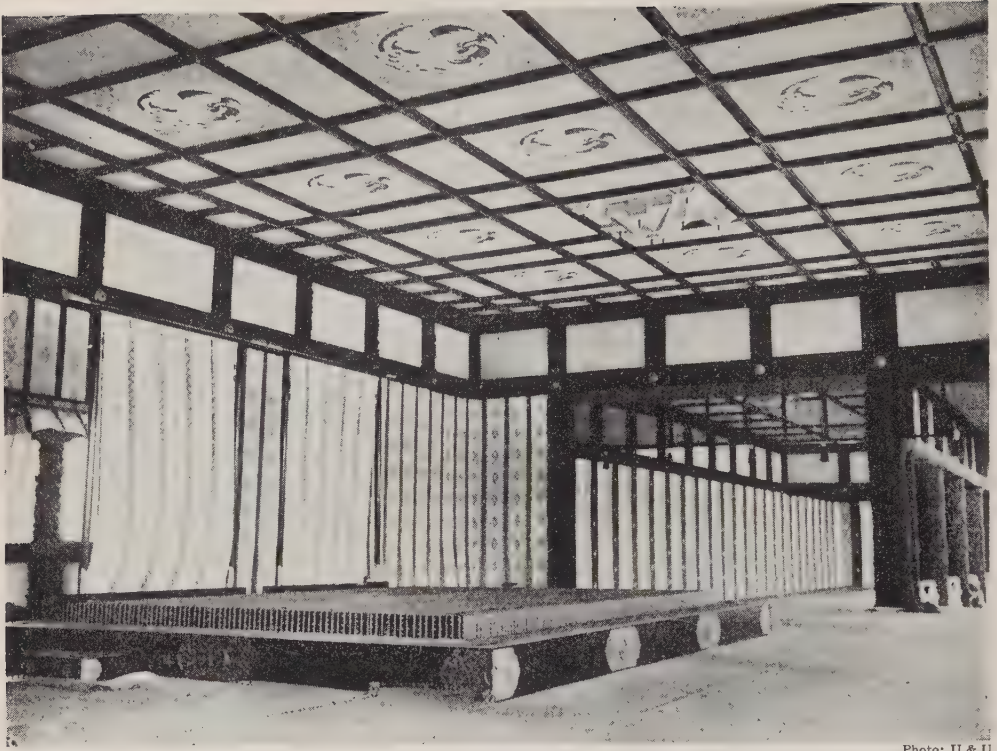


Photo: U & U

SIMPLICITY OF THE IMPERIAL THRONE ROOM

In the center is the dais for their majesties, the emperor and empress.

common classes, in which the farmers held higher rank than the artisans or traders.

Foreign Intercourse. In 1542, Portuguese Roman Catholic missionaries had brought Christianity to the island-empire, and in spite of much opposition, it spread rapidly. For a time the Portuguese had trading relations with Japan, but in the sixteenth century these were forbidden, Christianity and Christians were driven out, Shintoism was revived, and for more than two centuries, the empire remained shut up within itself. The avowed principles of the government were to "prevent the introduction of foreign dangers," and to "preserve unchanged the condition of the native intelligence"; hence foreign vessels were not allowed to touch at any Japanese port. For a time the Dutch had special limited privileges, but otherwise Japan was inaccessible to the outside world. In 1854, however, Commodore Matthew C. Perry appeared in a Japanese harbor with a squadron of United States vessels, and fairly forced from the secluded nation a treaty of friendship and commerce. Other countries were not slow to take advantage of this American success, and port after port was opened up to trade. Bitter was the protest on the part of the "Japan for Japanese" patriots, but the other policy pre-

vailed and the seclusion of Japan was ended. In 1867, the shogun was forced to resign, and in the following year, the progressive Emperor Mutsuhito abolished the shogunate; then, with the consent of the lords and knights themselves, the feudal system was dissolved. What was virtually a new empire was created. American and European educators, statesmen, soldiers, and seamen were invited to reorganize practically every department of the national life; Western laws were introduced, and in 1889 a Constitution was proclaimed. The court emerged from its long seclusion, the nobility was organized according to European ideas, and the tide of progress became too strong to oppose. In no other country has such a complete upheaval of the social and economic organization of centuries been made by the people themselves.

A Period of Wars. Marvelous indeed was the progress made, and one of the nations which viewed it with great jealousy was China. War between the two powers broke out in 1894, disagreement over Korea being the main cause, and, with the aid of its modern navy, Japan was completely successful. The navy of China, upon which that country had placed its chief reliance, was destroyed, and China was forced to sue for peace. Taiwan was



Photo: U & U

IN MEMORY OF AMERICA'S FIRST CONSUL-GENERAL TO JAPAN

The inscription relates an historic incident: "In memory of Townsend Harris, American Consul-General, who by the Treaty of Yeddo, July 29, 1858, opened Japan to the world, and on this spot, September 4, 1856, raised the first consular flag in the empire, and here resided until November 23, 1857. Erected by Viscount E. Shebusawa, Edgar A. Bancroft (late American Ambassador to Japan), and Henry M. Wolf of Chicago. Paragraph from the Consul's diary: Thursday, September 4, 1856. Slept very little from excitement and mosquitoes; the latter are enormous in size. Men on shore to put up my flag staff. Heavy lot. Slow work. Spar falls, breaks cross-trees; fortunately no one hurt. At last get a reinforcement from the ship. Flag staff erected. Men form a ring around it, and half past two P.M. of this day I hoist the first Consular flag ever seen in this empire. Grave reflections. Ominous of change. Undoubted beginning of the end. Query—if for real good of Japan."

ceded to Japan, and Korea was declared independent. Japanese objection to Russia's encroachment in Korea and Manchuria culminated in 1904 in a war, the greatest struggle in Japan's history, from which it emerged victorious (see RUSSO-JAPANESE WAR). By the Portsmouth Treaty, Japan secured the southern half of Sakhalin, the cession of the lease of Port Arthur, and sovereignty over Korea, which it subsequently annexed, in 1910.

Late History. The year 1914 was marked by a disastrous volcanic eruption on the southern end of Kiushu, during which hundreds of lives were lost, and by Japan's entrance into the World War. In accordance with the Anglo-Japanese agreement made between England and Japan, in 1905, Japan declared war against Germany and took Shantung, with the aid of British forces; its later duty was the important one of police and convoy work for the Allies in the Mediterranean. After the war, Japan was awarded Shantung, but

in the Washington disarmament conference (1921), the claim was abandoned.

Thousands of Japanese emigrated to the United States, where alarm as to their presence on the Pacific coast culminated in the immigration law passed by Congress in 1924, definitely excluding them from residence in the country [see CALIFORNIA (Oriental Immigration)]. Japan felt this discrimination keenly, but recognized that neither the American people as a whole nor the press of the United States supported Congress in the move.

In September, 1923, the greatest earthquake ever recorded completely destroyed Yokohama and sixty per cent of Tokyo, causing the deaths of over 91,344 people; 13,275 were never accounted for, 16,514 were permanently injured, and millions were left homeless. The devastation extended for many miles along the coast and inland in all directions. Property losses were more than \$2,750,000,000. Plans for the construction of new, modern

OUTLINE AND QUESTIONS ON JAPAN

Outline

I. Location and Size

- (1) An important island-empire
- (2) Relation to Asia
- (3) Chief islands
- (4) Possessions
- (5) Total area
- (6) Population

II. Its People and Cities

- (1) Racial types
- (2) Their characteristics
- (3) Mode of life
- (4) Education
- (5) Religion
- (6) Language and literature
- (7) Art
- (8) The cities of Japan

III. Physical Features

- (1) Surface
 - (a) Mountains and volcanoes
 - (b) Fujiyama
- (2) Waters
 - (a) Rivers
 - (b) Lakes
- (3) Earthquakes
- (4) Climate
- (5) Flora
- (6) Fauna

IV. Industries and Commerce

- (1) Mining
 - (a) Metals
 - (b) Coal
 - (c) Sulphur and petroleum
- (2) Fisheries
- (3) Agriculture
 - (a) Rice
 - (b) Farming population
- (4) Manufacturing
 - (a) Home industries
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 - (c) Industrial development
- (5) Transportation and Commerce
 - (a) By sea
 - (b) By rail
 - (c) The 'rikisha
 - (d) Merchant marine
 - (e) Exports and imports

V. Government and History

- (1) Government
 - (a) Diet
 - (b) Emperor
 - (c) Local government
 - (d) Military service
- (2) Early history
- (3) The middle age
- (4) Foreign intercourse
- (5) A period of wars
- (6) Later events

Questions

- What do the Japanese call their country?
- Why did early explorers seek Japan?
- What is the first definite fact in Japanese history?
- What two larger nations did Japan defeat in war?
- What qualities of the people have enabled them to profit greatly from their intercourse with other nations?
- What part do flowers play in the life of the Japanese?
- Why do not the rugs in a Japanese home get as dirty as those in a house in America?
- Why is one Japanese mountain familiar the world over?
- What are the chief merits of Japanese pictures? The chief defects?
- Who were the shoguns? When did the last shogun lose his power?
- What four racial types are represented in the modern Japanese nation?
- Why is the Japanese language particularly hard for a European or American to master?
- What country had most influence on Japan before 1860?
- Why are earthquakes frequent in Japan?
- How do the Japanese secure most of the salt which they use in their fishing industry?
- Why are terraced fields so characteristic a feature of Japanese farms?

POTTERY *and* LACQUER of JAPAN



PERFUME BURNER
KIOTO



HIBATCHI
FAIENCE

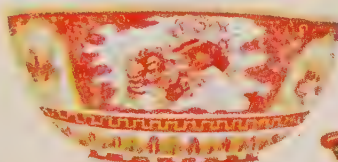
LACQUER
BOX



FAWN-COLORED
FAIENCE



SATSUMA VASE



RED
KAGA
WARE



LACQUERED PANEL



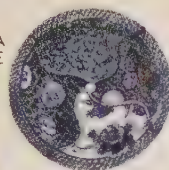
TEA KADDIE
KATATSUKI



GOLD
INCISED
VASE



KAGURA VASE



ARITA
WARE



INLAID
IRON
WORK



WATER POT
UNGLAZED



OLD TEA
BOWL
RAKU WARE



KIOTO
FAIENCE



POLYCHROMATIC
STONEWARE



KAN WU
ENAMEL WARE



YATSUSHIRO WARE



CUP UNDERGLAZE
YEIRAKU



TEA BOWL
RAKU WARE

cities were begun at once. The permanent rebuilding has been slow, because of vast condemnation of property for street-widening, but the commerce of both Tokyo and Yokohama has been considerably regained.

In 1912 the beloved Mutsuhito, who had ruled since 1868, died; he was succeeded by his son Yoshihito. The latter's ill health caused the Crown Prince Hirohito to rule as regent from 1921 until his father's death in 1926. Traditional Japanese mourning custom postponed Hirohito's coronation to 1928. Hirohito is well educated, widely traveled, and progressive.

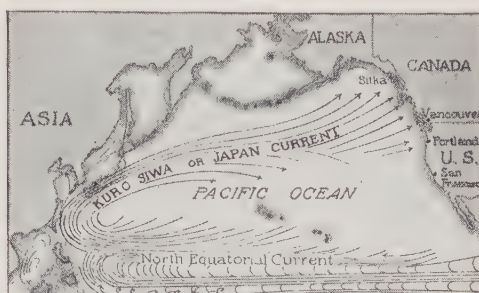
Japan recognized the Russian Soviet government and reestablished diplomatic relations with that country in 1925; important commercial concessions in Russia were gained, and foundations laid for economic coöperation. Treaties with China grant Japan commercial concessions in that country, and an extension of the lease of the Liaotung Peninsula, including Port Arthur and Dalny. J.F.M'K.

Related Subjects. The reader who is interested in Japan is referred to the following articles in these volumes:

CITIES	
Tokyo	Yokohama
HISTORY	
Boxer Rebellion	Perry, Matthew C.
China (History)	Port Arthur
Chosen	Russia (History)
Hirohito	Russo-Japanese War
Ito, Hirobumi	Shogun
Mikado	World War
Mutsuhito	Yoshihito
ISLANDS	
Formosa	Loo-Choo
Kurile Islands	Sakhalin
LEADING PRODUCTS	
Bamboo	Persimmon
Bean	Rice
Enamel	Silk
Lacquer Ware	Tea
UNCLASSIFIED	
Aino	Jinrikisha
Buddhism	Jujutsu
Fujiyama	Samurai
Hara-Kiri	

JAPAN CURRENT, OR KURO SIWO, OR SIWA, *koo' ro she' wo*, a warm current in the Pacific Ocean, corresponding in a general way to the Gulf Stream in the Atlantic Ocean. Sailors distinguish the current at sea by the deep blue of its waters and by the warmth that it brings from its tropical source. The south coast of Japan, along which it flows, enjoys a distinctly milder climate because of its influence. It was once generally believed that California and the west coast of North America owed their moderate temperatures partly to the warmth of the Japan Current, but this view is no longer held. The Japan Current originates in the north equatorial current of the Pacific near the southeast coast of

Asia. It passes the east coast of Formosa, is deflected to the northeast, and then heads toward the southwestern point of Japan.



THE JAPAN CURRENT

After passing the Kuriles and the Aleutian Islands, it spreads out and bends southward toward the coast of California. It has a lower temperature than the Gulf Stream and considerably less volume. See OCEAN (Ocean Currents). R.H.W.

Origin of the Japanese Name. The name *Kuro Siwo* means *blue salt*, and has reference to the tint of the salt ocean water.

JAPANESE BEETLE. See BEETLE (Harmful Species).

JAPANING, *ja pan' ing*, the art of applying to the surfaces of metal, wood, leather, papier-mâché, and other substances a variety of varnishes in imitation of the lacquered wares of Japan and China. Articles so coated are placed in stoves or hot chambers for the purpose of drying and hardening the varnishes. The various drying processes constitute the distinguishing features of this art.

Japaning owes its name to the famous lacquering of Japan, although the latter is prepared with entirely different processes and materials. Japaning is a process intermediate between painting and enameling, and is extensively applied in the finishing of tea trays, domestic iron goods (such as coal boxes, cash boxes, deed boxes, etc.), clock dials, and papier-mâché articles; portable baths are usually finished internally in white japan, and a modified form of japaning is employed for patent leather.

Japaning is done in clear, transparent varnishes, in black, and in body colors; but black is most frequently used. For fine work, which is first smoothed and polished, several coats of varnish are applied in succession, and each is separately dried at a heat which may rise to 300° F. Gold or bronze bands or floral decorations are generally added; in such cases the design is painted on in japanner's gold size and the gold leaf applied, after which the objects are again placed in the oven, and additional coats of varnish are given. Japan-

ning produces a brilliant polished surface, which is more durable and less affected by heat and moisture than ordinary painted or varnished work. See VARNISH.

JAPHETH, *ja' felh*, the youngest son of Noah. See NOAH.

JAPONICA, *ja pon' ih kah*. See CAMELLIA.

JARDIN DES PLANTES, *zhahr daN' day plahN'*. See BOTANICAL GARDEN.

JARL, *yahr'l*, an old Norse petty chieftain. See NORWAY (History).

JARVIS, ANNA, originator of Mother's Day (which see).

JASMINE, *jas' min*, the common name of a genus of climbing or erect shrubs belonging to the olive family, some species of which have beautiful white or yellow flowers of most

mon jasmine is *J. officinale*; the Spanish, *J. grandiflorum*. The so-called yellow jasmine is not a true jasmine, but a gelsemium, and the *Cape jasmine* is a gardenia (see GELSEMIUM; GARDENIA).

JASMINE, CAPE. See GARDENIA.

JASMINE, YELLOW. See GELSEMIUM.

JASON, *ja' sun*, in Greek legend, the son of Aeson, king of Iolcus, in Thessaly. When he went to Iolcus to regain the throne that had been usurped by his uncle, Pelias, the latter persuaded Jason to organize the Argonautic expedition in quest of the Golden Fleece. Victorious, Jason returned with his wife, Medea, who helped him to renew the youth of his father and to put to death the wicked Pelias. Jason and Medea then fled to Corinth, where, some time later, he deserted her and married Glauce, the daughter of the king of that country. In revenge, Medea sent a robe of cloth-of-gold saturated with a deadly poison which penetrated to the flesh of the wearer. The unsuspecting Glauce at once donned the garment and, after horrible sufferings, expired. Then Medea slew her three sons. To avenge these deaths, Jason started in quest of Medea, who passed over his head, gliding through the air in a golden chariot drawn by dragons. In despair, Jason slew himself upon the threshold of his new home. See ARGONAUTS; MEDEA; THESSALY.

The story of the robe of the cloth-of-gold is similar to the legend of the shirt of Nessus, described in the article HERCULES.

JASPER, a variety of quartz rock that is found in large quantities. It is of several colors—white, red, yellow, brown, and black—and these are sometimes arranged in layers. Jasper is a hard, strong rock, and takes an excellent polish. It is used for mantels, pillars, and interior finishings, and often for the walls of buildings.

Jasper of the first quality, when polished, forms a gem of considerable value. It was one of the stones in the breastplate of the Jewish High Priest (*Exodus* xxxix, 13) and is also mentioned in *Revelation* as one of the twelve stones in the foundation of the New Jerusalem (*Revelation* xxi, 19). The Greeks and Romans believed that it possessed healing properties and that it would draw the poison from snake bites.

Jasper is found in many localities. Some of the best-known quarries in the United States are at Pipestone, Minn., Sioux Falls, S. D., and in Colorado. A coarse variety of chalcedony (which see), commonly called jasper, was used by the Indians for arrowheads. A.N.W.

Literary Reference. It was of this rock that Longfellow wrote in *Hiawatha*:

At the doorway of his wigwam
Sat the ancient arrow-maker;
In the land of the Dakotahs,



Among the flowers no perfume is like mine;
That which is best in me comes from within.
So those who in this world would rise and shine
Should seek internal excellence to win.

—LELAND: *Jessamine*.

In the illustration (a) is branch, leaf, and flower of yellow jasmine; (b) the true jasmine.

delightful fragrance. The jasmies are native to the warm parts of the eastern hemisphere, but they are often seen in gardens of the Southern United States and in conservatories of the Northern states. The *common white jasmine* is a vinelike plant with very attractive dark-green foliage and sweet-scented white flowers. This is the jasmine, or jessamine, often extolled in poetry (see caption beneath the accompanying picture). The *Spanish jasmine*, with larger flowers tinged with red underneath, is grafted on two-year-old plants of the common species in Southern France. The bushlike plant resulting from the union bears very large and strongly fragrant blossoms, which are extensively used in the manufacture of perfume. The oil of jasmine extracted from the flowers of this plant is also obtained from those of the common jasmine for the same purpose. In China the flowers of jasmine are used to scent teas.

B.M.D.

Scientific Names. The jasmies constitute the genus *Jasminum* in the family *Oleaceae*. The com-

Making arrow-heads of jasper,
Arrow-heads of chalcedony.

[For picture showing position of the jasper in the breastplate of the Jewish High Priest, see HIGH PRIEST.]

JASPER PARK. See PARKS, NATIONAL (Parks of Canada).

JASPER WARE. See WEDGWOOD WARE.

JASSY, *yahs' e*, a city of Rumania. See RUMANIA (History).

JAUNDICE, *jawn' dis*, OR **ICTERUS**, *ik'-tur us*, staining of the skin and mucous membranes with bile pigment. Jaundice is an effect or symptom, and not a disease. It may be caused by gallstones, inflammation of the bile ducts or gall bladder, or anything which obstructs those ducts. It may be due to malaria or yellow fever, or may be caused by one or more forms of infection, at least one of which is spread by rats. It may result from bile pigments formed outside the liver, and in these cases the liver is not related to the disorder. Jaundice is a prominent symptom of cancer of the liver.

The symptoms of jaundice are yellowness of the skin, eyes, and lining of the mouth, bile in the urine, itching, mental depression, and nausea. Effort should be made to diagnose and treat the cause. To relieve symptoms, hot baths and sweats are employed. Weeks may be required to clear up the skin. See BILE; LIVER.

W.A.E.

JAVA, *jah' vah*, one of the richest and most populous islands of the world, the most important of the Dutch East Indies. It lies south of the equator, between the Sea of Java and the Indian Ocean, is separated from Sumatra on the west by the Strait of Sunda, and from the island of Bali on the east by the Strait of Bali. The island is long and narrow, its greatest length from northwest to southeast being 660 miles. Including Madura and several small adjacent islands which belong to Java, there is an area of 50,557 square miles, a little more than that of the state of New York and nearly twice that of New Brunswick. But within this territory live 35,000,000 people, nearly 700 to the square mile. All except about 170,000 are native Javanese, representing the highest type of Malay culture. They are a small, yellow-brown people.

Java is one of the most volcanic regions in the world, having forty-five volcanoes, ranging in height from 2,000 to 12,040 feet. It is in the western part of the island that they are most numerous and destructive. In 1686, in the eruption of Ringghit, 10,000 lives were lost, and in 1901, the Kloet, a smaller volcano, destroyed crops and towns 150 to 250 miles distant. An explosive eruption of Krakatoa, in the Strait of Sunda, in 1883, was one of the most disastrous in history. The dust from

this eruption scattered all over the world, and kept many large areas in a near approach to twilight for many months.

Java's mountains are fertile almost to their summits. They are overrun by wild flowers, and on their lower slopes there are fields of corn, tobacco, cabbages, and potatoes. The



LOCATION MAP

valleys and plains are exceedingly fertile, and are well watered by many rivers. Coffee, tea, sugar, cotton, fruit, and spices are extensively raised and exported. The flooded rice fields of the lowlands yield Java's most important crop and the chief food of the natives. An average of 8,000,000 acres of rice is always under cultivation. Teakwood, rubber, kapok, pepper, coffee, tin, and sandalwood are exports of importance. More than 14,000 tons of pepper are exported annually; Java is the world's principal source of supply of this commodity. The General Motors Company of the United States has an assembly plant for automobiles in Batavia.

[Kapok is grown on trees. It is somewhat like cotton, but lacks tensile strength. It is used for mattresses, and as it is twelve times as buoyant as cork, is in much demand for stuffing life preservers.]

The climate is uniform, the only change occurring in the rainfall during the wet and dry seasons. In the western section there is rain throughout the year, and thunderstorms are violent.

History and Government. Until the fifteenth century, the chief influence in the history of Java was Hindu. Notable among many relics of this period is the great temple Bolo Boldor, in Central Java. The island was conquered by the Mohammedans and remained in their power until the coming of the Europeans.

Java first came into touch with Europe when the Dutch East India Company established trading stations along the coasts. Dutch influence was gradually extended over the island, much the same as English control spread over India. From 1811 to 1816, under Sir S. Raffles, who was sent out by the English, the



Photo: U & U

Honoring the Dead in Java. The coffin is carried high up above the beautifully carved figures on the funeral tower, which is carried with much ceremony through the streets. Later, the coffin and the body are burned, and the ashes are cast into the sea.



"HERE COMES THE BRIDE"

Photo: U & U

A strange custom in a far-away land is here shown. A native bride of Java is being carried to the bridegroom's house on a bamboo sedan chair. The retinue of servants is hired for the occasion. She rides under golden parasols.

British controlled Java, but Holland regained the island, which has since been the seat of the Dutch colonial government in the East Indies. Holland and Java have been mutually benefited through their relationship.

The island is divided into seventeen residencies, similar to American counties, each under a resident (sub-governor), who is assisted by an advisory council. The resident and his assistants rule through a large array of native officials. Batavia (population about 150,000) is the capital city, and is also the capital of the entire Dutch East Indies. Java is famous for having one of the world's finest botanical gardens at Buitenzorg. See EAST INDIES, DUTCH; NETHERLANDS, THE.

JAVA SPARROW. See RICE (Enemies); WEAVER BIRD.

JAXARTES, jaks ahr' teez, RIVER. See ARAL SEA.

JAY. The jays form a subfamily in the larger group which includes ravens, crows, and magpies. They are smaller than the crows, and have more color in the plumage, but possess the mischievous, thieving ways characteristic of birds belonging to the crow family (see Crow). The best-known American species is the *blue jay*, whose bright-blue wings and

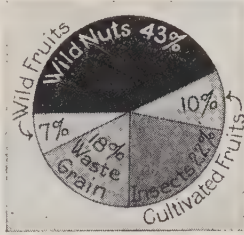
tail, barred with black, are a conspicuous part of the grayish-blue plumage. The blue jay also proudly wears a handsome crest of feathers, sloping up from the bill in pompadour fashion. This bird is a little larger than the robin, measuring eleven to twelve inches in length. Its range is Eastern North America from Southern Canada to the Gulf of Mexico, and west to the eastern parts of Kansas and Nebraska. It is a permanent resident, remaining in the open woods and in towns during the entire winter.

Blue jays take delight in teasing. They sometimes surround a sleepy owl in the daytime, torment him by pecking at him, and con-



AMERICAN BLUE JAY

fuse him by their shrill chatter. A graver charge against them is their habit of stealing eggs from the nests of song birds, and eating the young. On the other hand, they devour large numbers of grasshoppers, and feed on the eggs of the tent caterpillar and the larvae of the brown-tail moth. In this respect they are of distinct economic value. They eat some cultivated fruit and grain, but their vegetable fare is largely acorns and waste grain. Under some conditions, blue jays undoubtedly need control. They should not be shot indiscriminately, however.



FOOD OF THE BLUE JAY

In contrast with their less desirable traits, they have many domestic virtues. The male is devoted to his family. The three to six eggs, greenish or buff-colored and spotted with brown, are laid in a bulky nest high up in the crotch of a tree. The birds have a whistling bell note in the breeding season, but their raucous cries of *jay, jay* are heard most often. They imitate the cries of other birds very cleverly.

The *Canada jay* is a familiar object to hunters and loggers in the north woods. Because of its boldness in stealing food and camp refuse, this species has acquired such names as *whisky jack*, *meat bird*, and *camp robber*. It has gray plumage, and a subdued, gentle voice, quite unlike that of the blue jay. The *Rocky Mountain jay* and the *Oregon jay* are very similar in habits and plumage to the *Canada jay*. Various other species of jay are found in the Southern, Middle, and Western United States.

D.L.

Scientific Names. The jays form the subfamily *Garrulinae* of the family *Corvidae*. The blue jay is *Cyanocitta cristata*. The *Canada jay* is *Perisoreus canadensis*.

JAY, JOHN (1745-1829), an American jurist and statesman who rendered distinguished service to his country in the early period of its history. He was associated with John Adams and Benjamin Franklin in the negotiation of the peace treaty with Great Britain at the close of the Revolutionary War; he aided Alexander Hamilton in his efforts to secure the ratification of the Constitution, by writing some of the papers collected in *The Federalist*; and the most important treaty of Washington's second term, which bears his name, was negotiated by Jay.

He was born in New York City. In 1764 he was graduated from King's College (now Columbia University), and after a course in

law, was admitted to the bar in 1768. He represented New York in the First Continental Congress, held in 1774 at Philadelphia, was chosen a delegate to the Second Congress, and would have been one of the signers of the Declaration of Independence had he not been called away, in May, 1776, to take his seat in the provincial congress of New York. In 1778 he returned to Congress, and was president of that body from December, 1778, to September, 1779. In the latter year, he was sent as minister to Spain, and while abroad took part in framing the treaty with Great Britain which ended the Revolutionary War.

From 1784 until the organization of the government under the Constitution, Jay was Secretary for Foreign Affairs, and he was appointed by President Washington first Chief Justice of the United States Supreme Court. In 1794 he went to England and negotiated the Jay Treaty. In 1795 he resigned his exalted judicial post to become governor of New York, an office which he held for two terms. At the end of his second term, in 1801, he retired to private life.

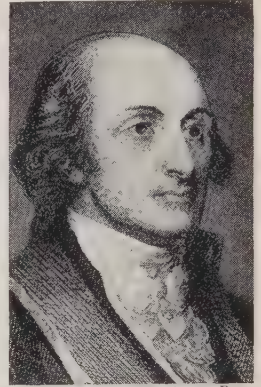


Photo: Brown Bros.

JOHN JAY

In reviewing the life of Jay, Daniel Webster said: "When the spotless ermine of the judicial robe fell on John Jay it touched nothing less spotless than itself."

Related Subjects. The reader is referred in these volumes to the following articles:

Federalist, The
Jay TreatySupreme Court of the
United States

JAYHAWKER STATE, one of the popular names applied to Kansas (which see).

JAY TREATY, the first treaty negotiated between Great Britain and the United States after the one that closed the Revolutionary War. After the Treaty of Paris, at the end of the war, trouble arose between the two countries over the treatment accorded the Tories (British sympathizers) who had remained in America. Among these were British merchants who were unable to collect old debts, though such payment was promised in the peace articles. In retaliation, Great Britain continued its garrisons in various forts on the northwestern frontier, and caused the Americans further annoyance by refusing to pay for negroes carried away by the English troops at the end of the war. An even greater cause for ill-feeling was England's insistence on the right

to search American vessels for supposed deserters from the British navy, and to capture merchant vessels carrying provisions to France.

To avert another war, for which the new American nation was ill prepared, President Washington nominated Chief Justice Jay as a special ambassador to negotiate a treaty adjusting the various points at issue. The publication of the resulting agreement, signed in London on November 19, 1794, caused intense indignation in America. Nothing whatever was said about the right of search or impressment, or compensation for kidnaped negroes; the evacuation of forts on the frontier was the only real concession to which England agreed. The United States agreed to pay all debts due British merchants at the outbreak of the Revolution, and to submit to a joint commission a dispute over the northeast and northwest boundaries. Though Jay was burned in effigy in numerous places, and President Washington was subjected to bitterest censure for acceptance of so unfavorable a treaty, in time the people came to realize that circumstances justified the action.

JAZZ, a modern and a syncopated form of music, of more or less discordant tones. It has brought the saxophone into general use, and this instrument has an important place in any jazz orchestra. Originally, jazz was a voluptuous dance among the Southern negroes, said to have originated in New Orleans in 1915. The origin of the name is not known. Jazz has met with great popularity, although, for a time, it was strenuously opposed by the lovers of classical music. Its effect has been objected to by the moralist, on conventional grounds. There are those who feel that, in its more modified forms, jazz may yet prove the basis for a distinctively American type of music. See MUSIC (What is Ragtime?).

JEANNE D'ARC, *zhahn dahrk*, the baptismal name of Joan of Arc (which see).

JEAN PAUL. See RICHTER, JOHANN PAUL.

JEANRON, *zhahn ron'*, PHILIPPE AUGUSTE (1807-1877), a French painter identified with the Barbizon school (see BARBIZON PAINTERS), born at Boulogne-sur-Mer. After occupying himself with subjects of everyday life, he turned to landscape work, and also found time to write critical reviews for periodicals. For a year or two after the revolution of 1848, Jeanron served as director of the national museums, and in this office was instrumental in improving the arrangement of the art collections in the Louvre. He also founded the Luxembourg Museum, for the exhibiting of modern paintings and works of sculpture. Jeanron's paintings include *The Isle of Calypso*, *Limoges Peasants*, and *Beholding of John the Baptist*.

JEAN VALJEAN, *zhahn val zhahn'*. See LES MISERABLES.

JEBEL AYASHI. See ATLAS MOUNTAINS.

JEBEL MAKMAL. See LEBANON, MOUNTAINS OF.

JEBEL NEBA. See NEBO, MOUNT.

JECKER, *zhe kair'*, JEAN BAPTISTE (about 1810-1871), a Swiss banker, connected with the attempt of France to found a Mexican empire under Maximilian. Jecker established himself in Paris as a banker, and in 1859 was commissioned by the French government to convert the domestic debt. Though this arrangement fell through, Jecker was authorized to explore Sonora and Lower California, thereby gaining a claim to Mexican territory. When Maximilian set up his rule, he found himself obligated to reimburse Jecker for giving up his rights in Sonora, but the emperor repudiated the final payment. Jecker then returned to France, where, in 1871, he was shot by the Commune.

JEFARA, NORTH AFRICA, the hottest spot on earth, so far as known. See TEMPERATURE.

JEFFERSON, JOSEPH (1829-1905), one of America's greatest actors, who was affectionately called "the dean of the American stage." He was born in Philadelphia, the third child of a family of actors; his great-grandfather had been a member of Garrick's company at Drury Lane, London. At the age of three Jefferson appeared in juvenile parts; he once said of himself, "I may almost say I was born in the theater." No other man in his profession was more honored, but he was never fully contented, for

he had longed to become a great painter; and devoted as he was to the stage, he felt that the other art was higher. His first pronounced success occurred in New York, in *Our American Cousin*, a play which developed unsuspected powers in him. (This was the play that Lincoln was attending in Ford's Theater, Washington, the night he was shot.) Jefferson also became a notable "Caleb Plummer" in Dickens' *Cricket on the Hearth*. He was most popular, however, as the kindly, harmless vagabond "Rip," in *Rip Van Winkle*, and with this character his name is mainly associated. He presented this play every season for forty years. In 1868 he created another famous rôle for himself as "Bob Acres" in *The Rivals*.

JEFFERSON, MOUNT. See WHITE MOUNTAINS; OREGON (The Land).

JEFFERSON, STATE OF. See TEXAS (History: Statehood).

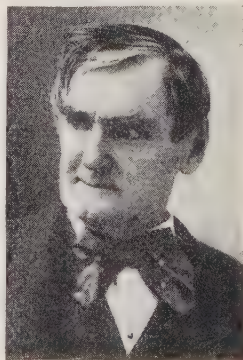
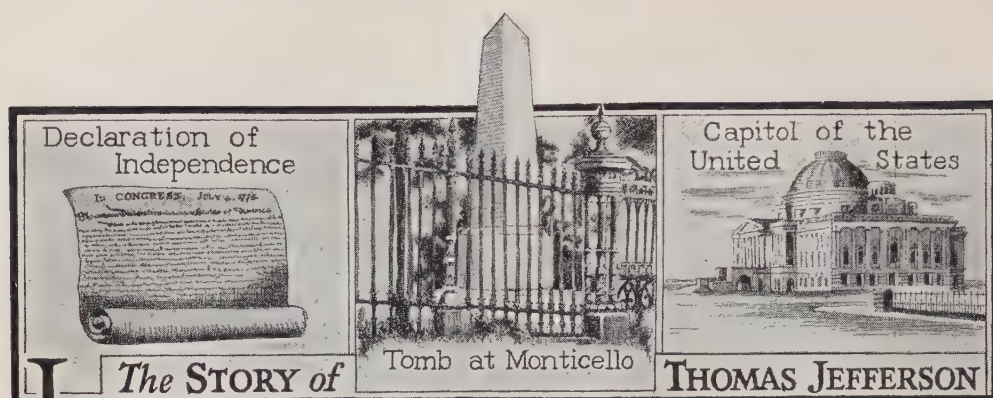


Photo: Brown Bros.

JOSEPH JEFFERSON



JEFFERSON, THOMAS (1743-1826), the third President of the United States, the principal author of the Declaration of Independence, and a distinguished diplomat and statesman. Shortly before his death, Jefferson wrote the following inscription to be placed over his grave:

Here was buried Thomas Jefferson, author of the Declaration of Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of Virginia.

This epitaph, he felt, expressed his claims to fame. The judgment of posterity has added a fourth claim, the purchase of Louisiana Territory from France.

His deeds may justify his fame, but they do not explain the veneration in which his name is yet held, and was held even in his lifetime, by the people of the United States. It has been said, and said truly, that most of Alexander Hamilton's views are reflected in the form of the American government, but that Jefferson's spirit has given them life. Jefferson took from the crumbling governments of the colonies and from the French Revolution the lesson that governments derive their strength from the consent of the governed. His system of political philosophy was based on individualism, which led to liberty in politics as in religion. His ideas were in line with American tendencies. The educated men of the colonies, the men who became the leaders of the new nation, were aristocrats, and with scarcely an exception they demanded a strong, centralized government and distrusted the people, most of whom were, indeed, uneducated. Almost alone of the leaders who helped to establish the government of the United States, Jefferson had a deep and unfaltering trust in the people, and the people in turn have made him the idol of American democracy.

Early Life. Thomas Jefferson was born at Shadwell, Albemarle County, Va., on April 13, 1748. His father, Peter Jefferson, was a man of prominence in the community, and at various times was county surveyor, justice of

the peace, and member of the Virginia House of Burgesses. Though Peter Jefferson owned slaves and an estate of nearly 2,000 acres, he did not belong to the Virginia aristocracy. His family had been well known in Western Virginia for over a hundred years, but had never tried to live in the easy, luxurious style of the great planters. In politics Peter Jefferson was a Whig, and in society he was thoroughly democratic. This liberal democrat married Jane Randolph, a member of one of Virginia's aristocratic families, and their eldest son was Thomas Jefferson.

The boy Thomas grew up strong and healthy, with a fondness for hunting and other outdoor sports, and to the end of his life, thoroughbred horses were apparently necessary to his happiness. At the same time, he inherited from his father an inclination for politics, literature, and mathematics. He sang and danced well, and even as a boy became an excellent violinist. In spite of all these interests, he did not neglect his studies. At seventeen he entered the College of William and Mary, then the foremost institution in the South; and at twenty, when he was graduated, he carried away a working knowledge of Latin, Greek, and French and a familiarity with natural science and mathematics extraordinary for one so young. After he left college, he added Spanish, Italian, and Anglo-Saxon to his accomplishments, and throughout his life he remained an eager student.

Soon after leaving college, Jefferson entered the law office of George Wythe, then the leader of the Virginia bar, and in 1767 was admitted to practice. He received a thorough grounding in the principles of the law, but never took great interest in practicing it. In addressing judges and juries, he was handicapped by a weak voice, which became husky after he had spoken only a short time. It seems, moreover, that he was disgusted with the current tendency to carry every little dispute to the courts, yet his conscientious, painstaking services brought him a large practice.

In the meantime, while still studying law, Jefferson had assumed the management of the estate left by the death of his father, in 1757. He was chosen to the office of justice of the peace, which his father and his father's father had held before him, and also, like his father, was elected to the House of Burgesses. This was in 1769, and the event marked his entrance into political life. Yet his political activity was rather that of the country gentleman, who naturally held political office as an incidental obligation due to his social prominence. He was constantly adding to his estate, until in 1772, when he married, he owned 5,000 acres, free of debt.

Jefferson and his wife were devoted to each other, and lived happily at Monticello, the home which Jefferson built after his father's house at Albemarle burned. He was very busy laying out gardens, trying to cultivate new plants introduced from foreign lands, and generally trying to make his new home attractive. Farming, landscape gardening, and architecture were at that time his hobbies.

The Shadow of Revolution. From 1769 he had been continuously a member of the House of Burgesses, and had been a leader in the attempts to maintain the rights of the colonists. In 1774 he was elected to the Virginia convention to consider the state of the colony. Illness kept him away, but he sent to the convention a series of resolutions which he wanted adopted as instructions for the delegates to the Continental Congress. The substance of these resolutions was that "emigration to this country [that is, America] gave England no more rights over us than the emigration of the Danes and Saxons gave to the present authorities of their mother country over England."

Declaration of Independence. This was radical doctrine, too radical for the Virginia convention, but it made Jefferson famous throughout the colonies, and resulted in his appointment as a delegate to the Continental Congress. On the tenth of June, 1776, he was appointed chairman of a committee of Congress to draft a declaration of independence. As chairman, Jefferson naturally wrote the document, and with the exception of one or two phrases suggested by Franklin and John Adams, the Declaration reported by the committee was entirely the work of Jefferson. Congress debated it for three days, during which a number of changes, chiefly omissions, were agreed on, but the Declaration of Independence, as it was finally adopted, still remained substantially as Jefferson had written it.

Services to the State of Virginia. Shortly after the Declaration of Independence was adopted, Jefferson withdrew from Congress, and in October, 1776, again took his seat in the Virginia legislature. He felt that the laws

of Virginia needed revision, and particularly that four proposed laws would form a foundation "for a government truly republican." These four measures were the repeal of the law of entail; the abolition of primogeniture; freedom of conscience and relief from support-

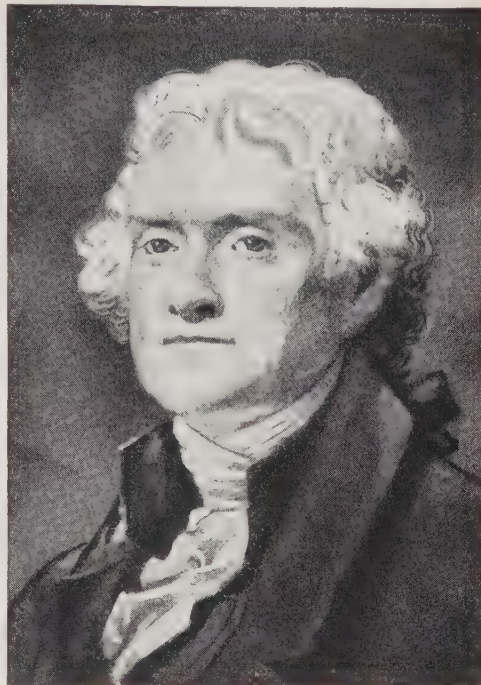


Photo: U & U

THOMAS JEFFERSON

Jefferson and John Adams died on the same day (July 4, 1826), the last great figures of the nation's first generation of statesmen.

ing, by general taxation, an established church; and a system of general education. District, grammar, and classical schools, a free state library, and a state college were a part of Jefferson's plan, but these were generations ahead of the times. Yet to Jefferson must be given great credit, for he was the first American statesman "to make education by the state a fundamental article of democratic faith." The other three measures were passed, not at once and not through Jefferson's influence alone, but he inspired other men to work for the same causes. In 1778 he introduced and secured the passage of an act to prohibit the importation of negro slaves into Virginia, and he labored to secure a revision of the penal laws. From 1778 to 1796, he and his friends, among them James Madison, worked for the restriction of capital punishment, and finally succeeded in eliminating the death penalty for all offenses except murder and treason.

In 1779, when the outlook for the colonies seemed darkest, Jefferson succeeded Patrick

Henry as governor of Virginia. His first term, 1779-1780, was uneventful, but during his second term, the state was overrun by British troops, and Jefferson himself narrowly escaped capture at their hands. His failure to defend the state against invasion was severely criticized by some persons, but he was powerless, for the state had already sent all available men and supplies to the army under Washington, and there were no means of defense. Jefferson was perhaps not fitted to be a governor in time of war, but his course had Washington's approval. At the expiration of his term he again became a member of the legislature, which answered his critics by giving him a vote of thanks and confidence for his services as governor.

Called to Serve the Nation. Less than a year later (in September, 1782), Jefferson's wife died, leaving to his care three daughters, the youngest only four months old. He had long since wished to retire from public life, and now determined to do so. He declined to go to France as peace commissioner, but when he was urged a second time, finally accepted, only to learn that the preliminary treaty had already been signed. In 1783 and 1784 he was again in Congress, where he was instrumental in securing the adoption of the decimal system of currency. In 1781, while Jefferson was governor, Virginia offered to cede to Congress its claims to the western territory, and in Congress, in 1784, he made the first draft of the ordinances for the government of this region. His plan, which applied to the lands south as well as north of the Ohio River, provided for the abolition of slavery in 1800. It was defeated in Congress, but was the basis of the Ordinance of 1787, which made the Northwest free territory. Jefferson was himself a slave-owner, but he believed that justice and patriotism demanded the abolition of the system.

American Representative in France. In May, 1784, Jefferson was sent to Europe to assist Benjamin Franklin and John Adams in negotiating commercial treaties, and in the next year was appointed minister to France. Measured by the diplomatic results, his stay in France was not important, because Europe in general and France in particular had internal troubles and were not interested in the United States. But his personal charm, his culture, his simplicity, his sympathy with French ideals, impressed all with whom he came into contact, and did much to set the United States in a more favorable light among Europeans. He was greatly interested in the French Revolution and the events leading to it, and it is not unfair to say that his political philosophy always showed the influence of the five years he spent in France. His personal popularity in France may be judged from

the fact that in July, 1789, while he was still accredited as minister to the French king, he was invited by the National Assembly to assist in drafting a new French Constitution.

Secretary of State and Vice-President. In the late autumn of 1789, Jefferson was granted a six-month leave of absence and sailed for home. He planned to return to France at the end of that time, but with great reluctance finally accepted the position of Secretary of State, at President Washington's urgent request. He was the first to hold this Cabinet position. His tenure of the office was not a happy one, for he had no sooner entered on his duties than he became the open leader of the Democratic-Republicans, who believed in state sovereignty and trusted the people. Alexander Hamilton, the leader of the Federalists, was also in the Cabinet as Secretary of the Treasury, and he used his great influence in favor of a strong, centralized government. Jefferson, in short, admired French republican models; Hamilton, British monarchical models. The two men were personally and politically antagonistic, and it was with great joy that Jefferson induced Washington to accept his resignation.

A few months later, when Hamilton, too, resigned, Washington again offered Jefferson the post of Secretary of State, but the latter declined it. He was determined more than ever, he said, to devote the remainder of his life to farming. Nevertheless, in 1796 he allowed his name to be used as a candidate for the Presidency to succeed Washington, and escaped election by the narrow margin of three votes. John Adams received seventy-one electoral votes to sixty-eight for Jefferson, who, under the Constitution as it then existed, became Vice-President. Adams and Jefferson were of opposite parties, and throughout his term the President steadily disregarded the Vice-President. Jefferson had no share in fixing the government's policy; in fact, he remained the leader of the opposition party, and wrote the Kentucky Resolutions, the most vigorous statement of that party's views.

Election of 1800. The Presidential election of 1800 was bitterly contested. There were four leading candidates, Jefferson, Aaron Burr, John Adams, and Charles C. Pinckney; Jefferson and Burr were Democratic-Republicans; the other two were Federalists. Under the Constitution, each elector cast two ballots without designating which was for President and which for Vice-President, and the result gave Jefferson and Burr each seventy-three votes, Adams sixty-five, and Pinckney sixty-four. The election was thus thrown into the House of Representatives, which was controlled by a Federalist majority. A few Federalists, willing to go any lengths to defeat Jefferson allied themselves with Burr, after a series of



"Monticello," the Home of Jefferson.

The house and 640 acres of the estate were purchased for about \$500,000, raised by subscription, that the home might be preserved to posterity.

LEADING FACTS JEFFERSON'S ADMINISTRATIONS

Lewis and Clark Expedition 1803

intrigues, but Hamilton, still the leader of the Federalists, threw his influence to Jefferson, who was finally elected by the vote of ten states to four for Burr. The members of the House voted by states, not as individuals. This contest, which threatened to disrupt the government, resulted in an amendment to the Constitution, adopted in 1804, by which electors are required to name their choice for President and Vice-President, respectively, and by which the House is allowed, in case no candidate has a majority, to choose from the three candidates receiving the most votes, instead of two candidates as before.

Administrations of Thomas Jefferson, 1801-1809. Jefferson served two terms; he was re-elected in 1804 by an electoral vote of 162 out of 176 votes cast. When Jefferson entered office he held extreme theories

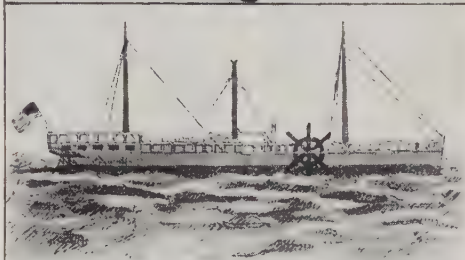
of strict construction of the Constitution, and he set about putting them into effect. The navy, created during the preceding administration, he cut down by putting out of commission all but six ships. He secured a reduction in the appropriations for the army and the diplomatic service, and in every way tried to lessen the expenses and the functions of the government. He also took steps, in 1802, to end the collection of internal revenue, and in 1803 secured from Congress the repeal of the national bankruptcy law, which had been passed in 1800.

A vigorous assertion of national feeling, however, was the course he followed in relation to the piratical Barbary States. Nearly twenty years earlier, while minister to France, he had urged the United States government to refuse further tribute to the pirates. In 1801 Tripoli, one of these Barbary States, demanded an increased annual payment, which was refused. Tripoli thereupon declared war, and Jefferson responded by sending an American squadron under Decatur into the Mediterranean Sea. Tripoli's ports were blockaded and bom-

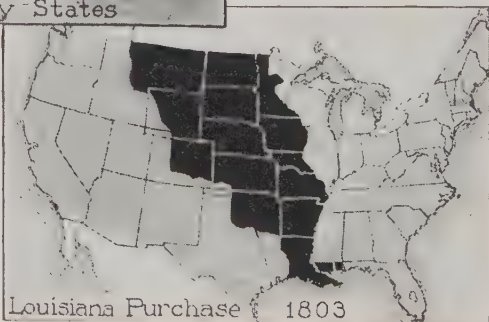
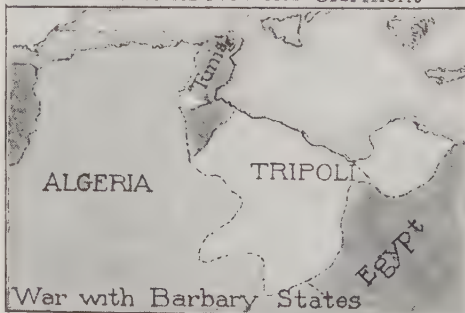
barded, and in June, 1805, Tripoli asked for peace. The United States was thus the first nation in the world to gain immunity from tribute and piracy in the Mediterranean.

The crowning achievement of Jefferson's first administration, however, was the Louisiana Purchase. Jefferson himself doubted the constitutionality of the act, and he was taunted by his opponents for abandoning his principles of strict construction. Yet the purchase was also proof of Jefferson's farsightedness, of his practical statesmanship, of his willingness to subordinate personal views to whatever seemed, in the last analysis, for the common good.

Re-elected in 1804 by an overwhelming majority, Jefferson's second term began auspiciously. The nation was prosperous, commerce was flourishing, and



Fulton's Steamboat, the Clermont



American ships carried much of the trade of Europe. Unfortunately, the war between England and France (the Napoleonic wars) had broken out again in 1803, and the United States was destined to suffer at the hands of both belligerents. Jefferson endeavored to secure for the United States and other neutrals certain rights which belligerents acknowledged in theory, but refused to concede in practice. Great Britain, as the first step, declared a blockade of the European coast from Brest to the Elbe River. To this Napoleon replied by declaring a blockade of the British Isles, bringing to the front what was known as the Continental System. Great Britain, moreover, made a practice of stopping and searching American merchantmen for contraband and for British citizens, a practice which came to a climax in the "Chesapeake Affair." Henceforth British vessels were forbidden to enter American harbors, and in December, 1807, Congress passed the Embargo Act. The Embargo, however, did France and Great Britain little damage, whereas it practically ruined American commerce and nearly alienated the New England states. It was evaded by many shippers in the United States, and was finally replaced, in 1809, by the Non-Intercourse Act. Jefferson always believed that the Embargo was justified, and that it would have attained its object if the nation as a whole had been willing to make the sacrifices demanded.

During Jefferson's eight years in office, many other noteworthy events took place, with some of which he was not personally concerned. Ohio was admitted as a state in 1803, and the United States Military Academy at West Point was founded in the same year. Robert Fulton's first successful steamship, the *Clermont*, was completed in 1806, at the same time that the Cumberland Road, the first of the national highways, was begun. In 1807 Congress voted to abolish the slave trade, and the act went into effect on January 1, 1808. One of the first results of the Louisiana Purchase was the Lewis and Clark Expedition; it not only secured much valuable information about the land purchased from France, but strengthened the claim of the United States to the great Oregon country. The purchase of Louisiana Territory, on the other hand, had one unfortunate result—the various attempts of Aaron Burr to set up a new government in the West. Burr had killed Alexander Hamilton in a duel in 1804, and was, in consequence, far from popular, especially in the East. In the West, however, he found new friends, men who were willing to support the more or less treasonable schemes which are explained elsewhere in these volumes.

The "Sage of Monticello." Following the example of Washington, Jefferson refused to be a candidate for a third term, and on March

4, 1809, laid aside the cares of office. He continued his interest in political affairs, however, and was constantly consulted by Presidents Madison and Monroe, whose policies he approved. As was often said, they were "three men and one system." Not only Madison and Monroe, but hundreds of others, consulted him. Visitors came to Monticello from all parts of the United States and even from Europe, to seek his advice, to bring him gifts, or merely to pay their respects. On many occasions his housekeeper had to provide sleeping accommodations for as many as fifty guests. Living with Jefferson were his daughter Martha, her husband, and their eleven children, and also the son of his deceased daughter Mary. Surrounded by grandchildren and honored by all, he lived the life of a patriarch. But his finances, seriously embarrassed by the War of 1812 and by hard times, could not stand the strain of his open-handed hospitality, and in the closing years of his life he was practically a bankrupt. Contributions from friends and the public kept his last days from poverty and deeply touched his heart. Monticello has been purchased by subscription gifts and will be preserved as a memorial.

The last great work of his life was the establishment of the University of Virginia. For forty years he dreamed of this institution, which was to crown the school system of the state, and he finally secured an appropriation for it from the legislature. He drew the plans for the buildings, and personally superintended their construction. He engaged the laborers, bought the bricks, and selected the very trees to be used for timber. He mapped out the courses of study and engaged the faculty. The university opened in March, 1825, with forty students, but Jefferson lived to see this number increase in the next year to 177. It is a high tribute to him that, in its educational aims, in its administration, and in its curriculum, it anticipated the typical American university of the twentieth century. The university was a fitting capstone to the life which came to an end on July 4, 1826, just fifty years after the adoption of the document which first made Jefferson's name a household word in the new American nation. John Adams, his old rival, died on the same day. E.D.F.

Mistress of the White House. When Thomas Jefferson became President, his wife had been dead nineteen years, and his two daughters were unable to be with him in Washington for more than a short time. Mrs. Madison, wife of the Secretary of State, acted as mistress of the White House when she came to Washington. Later, in spite of the opposition of Washington society, President Jefferson abolished official receptions as inconsistent with his democratic principles, but Mrs. Madison continued to act as hostess at state dinners and similar functions.

OUTLINE AND QUESTIONS ON THOMAS JEFFERSON

Outline

I. Years of Preparation

- (1) Birth and parentage
- (2) Education
- (3) Early public activities
 - (a) In the Virginia House of Burgesses
 - (b) Chosen delegate to the Continental Congress
- (2) Strict construction in practice
 - (a) Navy put out of commission
 - (b) Other items
- (3) War with Barbary States
- (4) Louisiana Purchase
 - (a) Lewis and Clark Expedition
- (5) Relations with France and Great Britain
 - (a) Continental System and Orders in Council
 - (b) Chesapeake Affair
 - (c) Embargo Act
 - (d) Non-intercourse Act

II. Early Years of Leadership

- (1) The Declaration of Independence
- (2) In the Virginia legislature
 - (a) Important revision of state laws
- (3) As governor of Virginia
- (4) In Congress
 - (a) The Northwest Territory question
- (5) As minister to France
- (6) As Secretary of State
 - (a) Clash with Hamilton
- (7) As Vice-President with John Adams
- (6) Twelfth Amendment
- (7) Abolition of slave trade
- (8) Internal affairs
 - (a) Ohio admitted
 - (b) West Point established
 - (c) Fulton's steamboat
 - (d) Cumberland Road
 - (e) Duel between Burr and Hamilton
 - (f) Burr's conspiracies

III. His Administrations

- (1) Election of 1800
 - (a) Candidates
 - (b) Issues
 - (c) Contested outcome
 - 1. Jefferson chosen by House

IV. Last Years

- (1) The "Sage of Monticello"
- (2) Financial affairs
- (3) The University of Virginia founded
- (4) Death and character

Questions

What lesson did Jefferson draw from the French Revolution? How did he put it into practice?

How did one of Jefferson's chief political adversaries help to elect him to a high office?

What did Jefferson wish to have carved on his tombstone?

On what theory did Jefferson base his belief that the colonies had a right to be free, and what illustration did he draw from early English history?

What shows the advanced character of his ideas on education?

In what way was Jefferson related to the "first families" of Virginia?

How may it be said that many wrongdoers in Virginia owed their lives to Jefferson?

How did the youth of Jefferson differ from that of Grant, Garfield, Jackson, and others of the Presidents?

Why did his adversaries feel that he was acting contrary to his principles in purchasing the Louisiana Territory?

Why could Jefferson never become a very effective public speaker?

What famous man was killed during Jefferson's administration by another of almost equal fame?

To what extent was Jefferson the actual author of the Declaration of Independence?

How are the national services of Jefferson regarded by the Democratic party of to-day?

What was his general attitude toward slavery?

Who served as White House hostess when Jefferson was President?

When Martha Skelton married Thomas Jefferson, in 1772, she was a charming widow of twenty-three, the daughter of John Wayles, a wealthy Virginia lawyer. She was noted for her beauty, intelligence, and accomplishments, and she inherited from her father 40,000 acres of land and 135 slaves.

The Jeffersons spent busy, happy years at Monticello, but in 1782 Mrs. Jefferson died, leaving to her husband's care their three daughters, one of whom survived her mother only two years. Martha and Mary were educated in European convents, then returned to America, and were married. Martha married her cousin, Thomas Mann Randolph, who was later governor of Virginia; she reared a large family of children, and was her father's companion during his years of retirement. One of her children, James Madison Randolph, was born while she was visiting her father in Washington; he was the first child born in the White House.



Photo: U & U

MRS. JEFFERSON

Related Subjects. The reader who desires additional information regarding events connected with the life and times of this President is referred in these volumes to the following articles:

Barbary States
Burgesses, House of
Burr, Aaron
Continental System
Cumberland Road
Declaration of
Independence

Embargo
Hamilton, Alexander
Lewis and Clark
Expedition
Non-Intercourse Act
Orders in Council
Primogeniture

JEFFERSON CITY, Mo. See MISSOURI (back of map).

JEFFERSON COLLEGE. See LOUISIANA (Education).

JEFFERSON RIVER, one of the sources of the Missouri. See MONTANA (Rivers).

JEFFERSONVILLE, IND. See INDIANA (back of map).

JEFFREYS, *jef' riz*, GEORGE, LORD (1648-1689), a judge of ill repute, who was called to the bar in England in 1668. He became a willing tool of the Crown; was rewarded by special favors from James, the heir to the throne; and was knighted soon after the latter became king as James II. Judge Jeffreys took an active part in the Popish Plot prosecutions. He was made Chief Justice of Chester and king's sergeant in 1680; he became a baronet in 1681, and Chief Justice of the King's Bench in 1683. As Jeffreys made his way through Dorset and Somerset during the "Bloody Assizes," he caused 320 rebels to be hanged, sentenced 840 to be transported, and a greater number to be imprisoned and whipped (see MONMOUTH, JAMES). After the downfall of James,

Jeffreys attempted to escape, disguised as a sailor, but was caught and sent to the Tower of London, where he died four months later.

JEFFRIES, JAMES. See PRIZE FIGHTING.

JEHOIAKIM, *je hoi' a kim*. See HABAKKUK.

JEHORAM, *je ho' ram*. See JEHU.

JEHOSHAPHAT, *je hosh' a fat*, one of the best kings of Judah, whose prosperous reign of over twenty years was blessed with riches and honor by the favor of God. Soon after Jehoshaphat became sole ruler of his country after the death of his father Asa, he appointed a commission to instruct the people of Judah concerning God. The nation reached such a high degree of piety that "the fear of the Lord fell upon all the kingdoms of the lands that were round about Judah" (*II Chronicles* xvii, 10). This was the climax of their prosperity, for even the Philistines and Arabians, instead of making war, brought presents and tribute money to Jehoshaphat. His reign, which ended in 850 B.C., when he was sixty years old, stands out in marked contrast to the succeeding reigns, characterized as they were by idolatry, moral degradation, and political disaster. However, he sowed the seed of future evil when he married his son Jehoram, who was the successor to the throne, to the daughter of Ahab, the idolatrous king of Israel.

JEHOVAH, the Old Testament sacred name for God among the Hebrews, especially during the period of the Prophets. At the time of the patriarchs, the name was known, and it was revealed anew to Moses, but it was not until the great awakening of the prophetic spirit under Samuel that the true meaning of *Redeemer* became attached to it. The name *Elohim* was frequently used by the psalmists, but *Jehovah* had the deeper significance, and was regarded with great awe by many, who avoided pronouncing the word by using, instead, the term *Adonai*, meaning *the Lord*. See GOD; JEWS.

JEHU, the founder of the fourth dynasty of rulers in the kingdom of Israel, who ascended the throne in 842 B.C., after a wholesale massacre of the family of the idolatrous King Ahab. Although a son of Jehoshaphat, the king of Judah, he entered the service of Ahab as a soldier, and had served for twelve years when Elisha, the great prophet of God, sent a messenger to anoint him king of Israel. To obtain the throne, Jehu led the soldiers whom he commanded against Jehoram, Ahab's son-in-law, then ruler. After killing Jehoram, he ordered all the seventy sons of Ahab put to death, and lured the priests of Baal into a heathen temple, where they were massacred. Soon after ascending the throne, Jehu purchased the favor of Shalmaneser, king of Assyria, by rich gifts, and this event was recorded on the black obelisk which is now in the British Museum. However, the twenty-eight years of

Jehu's reign were not very prosperous. The nation weakened considerably, but God promised the king that four generations of his family should rule in Israel.

A Modern Expression. "To drive like Jehu," which means to drive with excessive speed, arose from the Biblical description of Jehu's approach to the city when he attacked Jehoram. The watchman on the tower saw him coming and said, "The driving is like the driving of Jehu the son of Nimshi; for he driveth furiously" (*II Kings* IX, 20).

Related Subjects. The reader is referred in these volumes to the above reference to *II Kings* and to the following articles:

Ahab
Baal

Jehoshaphat
Obelisk

JEJUNUM, *je ju' num*. See ALIMENTARY CANAL.

JELlicoe, *jel'i ko*, JOHN RUSHWORTH, first Earl (1859-), admiral in the British navy, and created earl by King George in 1925. He entered the navy at the age of thirteen, served in 1882 in the Egyptian War, where he won a medal, and was soon commissioned as captain. Jellicoe served in China from 1898 to 1901, and was chief of staff to Vice Admiral Seymour during the attempted relief of Peking in the Boxer uprising (see BOXER REBELLION). The Order of the Red Eagle was conferred upon him by the emperor of Germany for his work in China. He was made rear admiral in 1907 and given a command with the Home Fleet, of which he became commander in chief in 1914. Jellicoe was commander of the British fleet in the Battle of Jutland, May 3, 1916. In 1928 he was created a Knight of the Grand Cross, Order of the Bath. See WORLD WAR.

JELLY, any semi-solid, tremulous food that liquefies when heated. The name is associated especially with preparations made from certain fruits that are said to "jell" readily. The juice of such fruits contains a certain carbohydrate called *pectin*, which becomes thickened in cooking. A good jelly fruit must also contain the proper amount of acid. The best jelly fruits are sour apples, crab apples, currants, cranberries, plums, half-ripe grapes, quinces, and lemons. Fruits having a low percentage of acid and pectin, such as peaches, cherries, raspberries, pineapples, pears, apricots, and strawberries, can be made into jelly by the addition of juice from some good jelly fruit, or through the use of a commercial pectin, which can be purchased in liquid or powder form. Commercial pectins are made from skins and cores of fruits used in canneries. In jelly-making, sugar is added to the juice in such proportion as the recipe states. In general, the greater the quantity of pectin, the larger the amount of sugar it is safe to use. Hence the jelly-maker gets a larger amount of jelly from a fruit rich in pectin.

Starch jellies are made from cornstarch, arrowroot, sago, and tapioca. The typical animal jelly is gelatin, which is made by boiling in water the muscles, cartilage, and skins of animals. E.V.M'C.

Related Subjects. For the food value and uses of the various jelly foods named in this article, refer to the separate articles, under their appropriate titles. See, also, FOOD; NUTRITION; FOOD PRODUCTS, PRESERVATION OF.

JELLYFISH, the name commonly applied to numerous species of free-swimming marine animals because of the jellylike consistency



Photo: U & U

A GIANT JELLYFISH

of their bodies. They are not true fish, all of which belong to the vertebrate group of animals. Jelly fish are classed with the coelenterates, the third lowest major division (phylum) in the animal kingdom (see COELENTERATA). There are two types of jellyfish, the *medusan* and the *ctenophoran* groups. The former are so called because the umbrella-shaped body is fringed with waving tentacles that suggest the circle of serpents that waved about the head of the mythical Medusa (see MEDUSA).

The ctenophores are jellyfishes of very peculiar structure, and they show such divergence from typical coelenterates that many zoölogists regard them as a separate group (see

ZOOLOGY, classification scheme). They are more nearly transparent than medusae, and many are shaped like walnuts, though some are spherical, some ribbon-like, and some thimble-shaped. Extending from near the mouth end of the body to near the other end are eight bands bearing comblike plates composed of cilia. By rhythmical movements of the cilia, the animal is slowly propelled through the water. The ctenophores are commonly called *comb jellies* and *sea walnuts*. They are found in all parts of the ocean, but are most abundant in warm waters. S.H.S.

JENA, *ya' nah*. See GERMANY (Principal Cities).

JENGHIS KHAN, *jen' giz kahn*, a variant of *Genghis Khan* (which see).

JENNER, EDWARD (1749-1823), an English physician, famous as the discoverer of vaccination as a preventive of smallpox and for his diagnosis of diseases of the heart. He was born at Berkeley in Gloucestershire, studied medicine at Saint George's Hospital, London, and afterward practiced as a country surgeon in Berkeley. His investigation of cowpox in 1776 was suggested by the local tradition that dairymaids who contracted the disease were immune from smallpox. To aid in his research, Doctor Jenner's son was inoculated with swinepox and proved to be immune from the more serious disease. The theory of vaccination was at first bitterly attacked by physicians and clergymen, but gradually gained ground until about 1800, at which time the practice was universally adopted in England, and soon spread to other countries. Doctor Jenner received many honors and rewards, and in 1802 and 1807, Parliamentary grants were made to him aggregating £30,000. See VACCINATION.

JENNINGS, SARAH. See MARLBOROUGH, JOHN CHURCHILL.

JENNY. See SPINNING JENNY.

JERBOA, *jur bo' ah*, the name of a group of small fawn-colored rodents characterized by

something like kangaroos, live in colonies in burrows, and are nocturnal. In cold climates they sleep through the winter. Jerboas are Old World rodents, frequenting deserts and grassy plains, but they have an American cousin in the small deer, or jumping, mouse (see DEER MOUSE). The best-known species is the *Egyptian jerboa*, a delightful pet when tamed. It is six to eight inches long, not counting the even longer tail, which is tufted at the end. Its forelimbs have five toes and are used chiefly as hands. The hind legs have three toes. In walking, the jerboa has an upright posture, and does not hop like a kangaroo. Another well-known species is the large *alactaga* of Turkestan, which the natives kill for food. W.N.H.

Scientific Names. Jerboas belong to the family *Dipodidae*. The Egyptian jerboa is *Dipus aegypticus*; the alactaga, *Alactaga decumana*.

JEREMIAH, a Hebrew prophet during the darkest period of the kingdom of Judah, whose warnings and utterances were disregarded, ex-



THE JERBOA

their short forelimbs and long hind ones, with which they run in bounding leaps when frightened. They are related to mice and rats, look



From the painting by Michelangelo

THE PROPHET JEREMIAH

cept by those who subjected him to all sorts of persecution because of them. He was the son of Hilkiah, a priest in Anathoth, a village close to Jerusalem, and was quite young when

called to prophesy in 626 B.C., the thirteenth year of Josiah's reign. For forty-one years, during the troubled times of Babylonian invasions, he endeavored to root out evil and warn his people against destruction, but the rulers regarded his sayings as bad omens. He saw Jerusalem besieged, his fellow citizens carried away as captives, and the city a heap of ruins. At the time of the capture, Jeremiah was in prison, but Nebuchadnezzar, the Babylonian conqueror, released him, and in a cave near by he wrote the book of *Lamentations* (which see).

During the rule of Gedaliah, whom Nebuchadnezzar had made governor of Judah, Jeremiah was safe in Jerusalem, but after Gedaliah was murdered, a remnant of the Jews fled to Egypt in spite of God's command, "Go ye not into Egypt" (*Jeremiah* XLII, 19), and forced the prophet to go with them. There he delivered his last prophecies concerning the conquest of Egypt by the Babylonians. The time and place of his death are unknown, although tradition says that he was stoned to death by his countrymen, who were incensed at his rebukes.

Book of Jeremiah. This book of the Old Testament, written by Jeremiah near the close of his ministry, is arranged not in the order of events but according to subjects. After the introduction there are three prophetic sections: first, a prediction of the approaching judgment upon Judah and the promise of restoration from exile; second, a history of the destruction of the nation; and third, predictions concerning foreign nations. The author foretold the exact date of the Captivity, the fate of Zedekiah, the return of the Jews, and the future decay of Babylon. The last chapter seems to be an historical addition made by some later writer, possibly Ezra, and serves as an introduction to *Lamentations*, which follows.

JERICHO, jeh' rh ko, an ancient city in Palestine. See PALESTINE (The Cities).

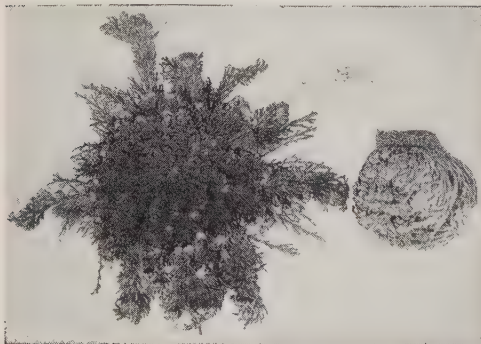


Photo: Visual Education Service

JERICHO ROSE

This is best known as the resurrection plant. The picture shows it both rolled and opened.

JERICHO ROSE, a plant of the mustard family, native to Arabia. It has interesting

habits of growth. After the flowers appear, the leaves drop and the branches curve inward until the plant looks much like a ball. In this form it detaches itself from its roots, rolls around, and is often blown by the wind into water. When moist, the branches expand, and the pores open and release the seeds. If taken up before it is quite dry, the plant will retain for some time its characteristic of contracting in dryness and expanding and growing greenish in moisture. It is the best known of the "resurrection" plants. B.M.D.

Scientific Name. The Jericho rose belongs to the family *Cruciferae*. Its botanical name is *Anastatica hierochuntica*.

JERITZA, jeh reet' zah, MARIA (1893-) a grand-opera soprano who, in addition to possessing a lovely voice and personal beauty, is an actress of unusual talent. She was born in Brünn, Austria (now a town of Czechoslovakia), and secured her musical education in her native land. For the first ten years of her career she remained almost continuously in Vienna, where highest operatic honors were accorded her. She has sung leading rôles in nearly fifty operas since her début in 1910, as Elsa in *Lohengrin*. In 1921, in the Metropolitan Opera House in New York, an American audience greeted her for the first time; she scored an immediate success, and her popularity has been steadily maintained, both in opera and in concert.



Photo: U & U

MARIA JERITZA

JEROBOAM, jeh ro bo' am, the name of two kings who ruled over the tribes of Israel.

Jeroboam I, the energetic king of the Ten Tribes of Israel, was elected when the ten separated from the tribes of Judah and Benjamin, at the death of Solomon in 931 B.C. As first king of this new union, he established two places of worship, one at the north and one at the south end of his kingdom, instead of sending his people to the Temple at Jerusalem. At both places he built golden calves, thereby introducing idolatry into the worship, which gradually degraded the nation.

Jeroboam II, the most prosperous of the kings of Israel. He raised the kingdom from a very depressed state upon ascending the throne in 790 B.C., and succeeded in restoring its former prestige by capturing Damascus, the capital of the Syrian empire, and Hammath, one of the Hittite towns. During his reign, Amos and Hosea prophesied against the wickedness and idolatry which prevailed.

JEROME, je rohm', JEROME Klapka (1859-1927), an English author who gained a reputa-

tion in several different forms of writing. He was born in Staffordshire, educated at the Philological School, Marylebone, and was successively clerk, stenographer, tutor, actor, and journalist. In 1889, with the publication of his delightful *Idle Thoughts of an Idle Fellow* and *Three Men in a Boat*, he became widely known as a humorist. His comedies, including *Barbara*, *Sunset*, *Wood Barrow Farm*, and others, and his serious plays, *The Passing of the Third Floor Back*, were well liked. The last-named proved a successful vehicle for Sir Johnston Forbes-Robertson (which see).

Other Writings. Jerome also wrote novels, short stories, books on the theater, and essays. Well-known titles include *Stage Land*, *Novel Notes*, *Sketches in Lavender*, *Tommy & Co.*, *They and I*, *All Roads Lead to Calvary*, *Anthony John*, and *Miscellany of Sense and Nonsense*.

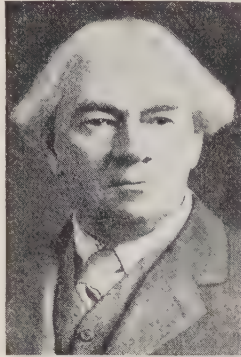


Photo: Bain News Service

JEROME K. JEROME



Photo: U & U

SAINT JEROME

From the painting by Albrecht Dürer.

JEROME, SAINT, a learned father of the Roman Church and a prolific writer of theological and historical works, various letters,

translations, and works on the Bible. He was born at Stridon, a small town of the Illyrian Alps, about the year 340. From 374 to 379 he led the life of a recluse in the desert of Chalcis, southwest of Antioch. After these four years he went to Antioch, where he was ordained priest; he then went to Constantinople, where he became teacher and friend to Gregory of Nazianzus. In 382 he returned to Rome. On the death of Pope Damasus, Jerome was compelled to leave Rome, as his position became a very difficult one on account of harsh criticisms which made him many bitter enemies. He settled in a monastery near Bethlehem in 386, and again became a recluse and student. His Biblical knowledge gave him rank among ancient expounders of the Bible, and his Latin interpretation of the Old Testament was the foundation of the Vulgate (which see). See, also, **BIBLE**.

JEROME OF PRAGUE (1360-1416), a religious reformer who was burned at the stake for heresy. He was a staunch companion and champion of John Huss, and it was his vigorous vindication of Huss's principles that cost him his life. Together they waged an energetic fight against the faults of the Church and the corruptness of the clergy. Huss was thrown into prison in 1415 and Jerome hurried to his defense, but was arrested and put into chains. After a great deal of suffering he agreed to disavow his opinions of the Church, but later strongly defended his heresies and the principles of Huss and Wycliffe. He was burned at the stake May 30, 1416, and his ashes were thrown into the River Rhine. See **HUSS**, **JOHN**.

JERROLD, DOUGLAS (1803-1857), an English dramatist, essayist, and humorist, remembered chiefly for his humorous sketches, *Mrs. Caudle's Curtain Lectures*, and for his successful play, *Black-Eyed Susan*. The latter, produced in 1829 in London, ran for 300 successive nights. Jerrold was born in London, and at the age of ten became a midshipman in the navy; two years later he apprenticed himself to a printer in London. By hard study he acquired a knowledge of Italian and Latin, but discovered that the bent of his genius lay in dramatic writing. He also acted as literary critic on the staff of *Punch*, and founded the *Illuminated Magazine* and *Douglas Jerrold's Shilling Magazine*.

Chief Writings. Jerrold wrote several dramas that attracted attention, including *Time Works Wonders*, *Nell Gwynne*, and *Rent Day*. His popular *Mrs. Caudle's Curtain Lectures*, the *Story of a Feather*, and other witty stories were written for *Punch*. His best novels include *The Mad Mode of Money* and the *Chronicles of Clovernook*. His *Life and Works* was edited by his son, Blanchard Jerrold, and in 1903 a volume of his essays was edited by his grandson, Walter Jerrold.

JERSEY, *jur' sie*, one of the Channel Islands (which see), the original home of the noted Jersey cattle.

JERSEY CITY, N. J., the second largest city in the state, and the county seat of Hudson County, is situated directly opposite New York City. Jersey City occupies a site of 19.2 square miles, on a peninsula formed by the Hudson River and Upper New York Bay on the east and south, and the Hackensack River and Newark Bay on the west. Population, 1928, 324,700 (Federal estimate).

Transportation. Ferries constantly cross the Hudson River between Jersey City and New York, and under the river are several tunnels. The double-tube Holland Tunnel, having an estimated hourly capacity of 3,800 vehicles, was completed in 1927. Jersey City is the terminus of nine trunk lines, which enter the stations of the Pennsylvania, the Central of New Jersey, the Erie, the Lehigh Valley, and the West Shore roads. Interurban and motorbus lines operate to neighboring New Jersey towns. Trans-Atlantic and coast steamers dock at extensive wharves on the east water front.

Industries. Jersey City is a shipping and receiving port of importance; its figures, however, are included in those of the port of New York. There are extensive slaughtering and meat-packing establishments and large grain elevators. Among more than 700 industrial enterprises are the plants of Colgate & Company, the American Can Company, the Yale Electric Company, and the Joseph Dixon Crucible Company. Several plants were established in 1924 and 1925 for the manufacture of radio apparatus and supplies.

Education. The important educational institutions are Lightfoot Institute, City Normal School, Jersey City Dental College, Saint Peter's Academy, Saint Aloysius Academy, and Manresa Hall.

History. The first buildings on the site of Jersey City were erected in 1633, and the place was originally known as Paulus Hook. Here occurred one of the most brilliant feats of the War of Independence. Fortifications erected by Americans were taken by the British, who were surprised and driven out by a small force under Lieutenant Colonel Henry Lee ("Light Horse Harry"). The Americans later evacuated, and the British again took possession until the end of the war.

The city was laid out and incorporated in 1804. Under the name of Jersey City, it was reincorporated in 1820 and in 1838. Bergen and Hudson were annexed in 1869, and Greenville in 1873. The commission form of government was adopted in 1913. E.B.L.

JERSEY CLOTH, a plain-knitted, unribbed fabric used for dresses, suits, coats, sports costumes, etc. Though the cloth is usually made of wool, other fibers, such as silk, cotton, rayon, or mixtures of these, may be used. Jersey is knitted in tubular form, and the silk jersey is made on a warp knitting frame, to prevent raveling. The wearing qualities of all jersey materials are excellent, though there

is a tendency to stretching and sagging which causes the garment to lose its shape. Laundering usually shrinks silk or cotton jerseys back to the original form, but little can be done with the wool material. Wool jersey may be either napped or smooth, and is adapted for sports wear, rather than for dress occasions. Cotton jersey is also called *stockinette*; most cotton gloves are made from it. Jersey silk is used extensively for undergarments and gloves, and is marketed under such trade names as *Italian silk*, *Milanese*, *tricot*, etc. See KNITTING MACHINE.

JERSEY COWS. See DAIRYING (The Herd); CATTLE, page 1252.

JERUSALEM, *je ru' sa lem*. This ancient city of Palestine is sacred alike to Jews, Mohammedans, and Christians, but is especially



MAP OF MODERN JERUSALEM

- | | |
|----------------------------------|--|
| (1) Christian quarter | (10) Dome of the Rock |
| (2) Mohammedan quarter | (11) Site of ancient Temple |
| (3) Armenian quarter | (12) Calvary |
| (4) Jewish quarter | (13) Gethsemane |
| (5) Church of the Holy Sepulcher | (14) Tomb of Absalom |
| (6) Street of David | (15) Tombs of Saint James and of Zechariah |
| (7) Via Dolorosa | (16) Pool of Siloam |
| (8) Citadel | (17) Tomb of David |
| (9) Wailing Wall | (18) House of Caiaphas |

associated with the ministry and Crucifixion of Christ. The hill of Calvary, not far from the city gates, is known in every land. Jerusalem lies on a plateau about 2,500 feet above the level of the Mediterranean Sea, within the fork of two ravines, the valley of



Photos: U & U

Jerusalem of To-day. Above, the old wall, showing Herod's Gate. Below, the famous Wailing Wall, near the location of Solomon's Temple, of the days of ancient glory.

Kedron on the east and the valley of Hinnom on the south and west. On the southwest rises the celebrated hill of Zion, and to the east of the city is the Mount of Olives.

History. The history of the city can now be traced, through the discovery of cuneiform tablets at Tel-el-Amarna, in Egypt, back to the fifteenth century B.C. The name of the city occurs on a number of these tablets, written *Urusalim*, which probably signifies "The City of the God Salim." Though called the "city of peace," the history of Jerusalem is a tale of vicissitudes and tribulations. In the fifteenth century, all of Palestine was subject to Egypt, and the country was divided into provinces and sections controlled by governors who were responsible to the Egyptian king. Not long after the close of the fifteenth century, however, Egypt began to lose its hold on Palestine and Syria, and when the Hebrews began their conquest of Palestine, about 1200 B.C., they found the country an independent one in the possession of the Canaanites. Jerusalem itself was held by the group or clan known as Jebusites, from whom David captured the citadel. The Jewish king fortified the walls and built a palace for himself. In the days of his son and successor, Solomon, the palace was enlarged and an imposing structure was erected as the dwelling place of the national deity Yahweh. The area of the city was also extended. The city reached its greatest splendor under Solomon.

When, upon the death of Solomon, the Hebrew confederacy was split into two kingdoms, the northern and the southern, Jerusalem continued to be the capital of the latter, and because of the prominence of the tribe of Judah, it became known as Judea. The city shared the varying fortunes of the southern kingdom until 586 B.C., when it was captured by King Nebuchadnezzar of Babylonia, and the Jews taken captive. About half a century later, when Babylonia itself fell into the hands of Cyrus, the Persian king, permission was given to the Jews to return to their country, and Jerusalem, which had suffered terribly during the siege, was rebuilt. The Temple of Solomon, which had been destroyed, was re-erected on the ancient site, but the structure was inferior in magnificence to the original temple, which formed the great achievement of Solomon's reign.

In 332 B.C. Palestine fell to Alexander the Great and his successors, the Ptolemies of Egypt. About a century later, under Graeco-Syrian rule, a bitter conflict between the Greeks and the Jews threatened to stamp out the Hebrew religion. The sacred temple was desecrated by being made the center of the worship of Greek gods. Under the leadership of a family known as the Maccabees, the Jews regained control of Jerusalem, and a new era

of comparative prosperity ensued which lasted until the year 63 B.C., when the Romans under Pompey made Palestine a province of Rome. At the time of Jesus, Jerusalem was under the authority of the Roman procurator; Pontius Pilate. The Jews submitted unwillingly to the yoke of Rome, and in the course of a rebellion, the ancient city once more became a mass of ruins, in A.D. 70, by the orders of Titus. The Emperor Hadrian began the rebuilding of the city sixty years later, but changed its name to Aelia Capitolina.

With the triumph of Christianity in the Roman Empire, Jerusalem began to regain its position as a city now sacred to both Jews and Christians. During the fourth century, Constantine the Great, the first Christian emperor of the Roman Empire, did much to restore the ancient city. It was he who built the Church of the Holy Sepulcher over the traditional site of the burial of Jesus. Jerusalem now became a shrine venerated by Christian pilgrims from all over the known world. As the years passed, other beautiful buildings were erected. Saint Stephen's, north of the city, was built by the Empress Eudocia, and Justinian built Saint Mary's Church on the old Temple hill.

In 637 Palestine was conquered by the Mohammedans under the Caliph Omar, and in 691 the Mohammedans began the building of the great mosque known as the Harem esh-Sherif, popularly called the Mosque of Omar. It was erected on the site of the Jewish Temple around an ancient stone, the sanctity of which reverts to the days long prior to the occupation of the country by the Hebrews. This stone was known as the Dome of the Rock. Under Mohammedan dominion, the city passed through many vicissitudes, culminating in the Crusades, or Holy Wars waged by the Christians for the possession of the sacred place. The Crusades ultimately failed, and in 1517 Jerusalem became a part of the Turkish Empire.

During and After the World War. Before the end of 1915, Jerusalem had become again a great military center. The city and vicinity were crowded with the soldiers and military equipment of the Turkish Empire, and the old cloisters and pilgrim hospices were thronged with the sultan's hosts. Not since the days of the Crusades had such things been witnessed in that sacred territory. British and French troops, in 1917, under General Allenby, approaching from the southeast, pressed the Turks back into the city, and eventually beyond it. As the British were careful not to sacrifice the city to gunfire, it was not until December 10 that peaceful entrance was effected and the Turkish army forced out. In April, 1918, the Hebrew flag flew in the city for the first time in nineteen centuries. In



Photo: O R O U

GARDEN OF GETHSEMANE AND MOUNT OF OLIVES

1922 the administration of Palestine fell to Great Britain, under mandate from the League of Nations. See **PALESTINE**.

Modern Jerusalem. The modern city, whose population numbers about 64,000, is still surrounded by walls built in the Middle Ages. Outside of the walls, however, to the northwest, a large newer city has grown up, containing Christian churches, hospitals, and schools, many monasteries, and a large number of private dwellings, erected by Jews and Christians. The city within the walls is sharply divided off into four quarters, Christian, Armenian, Jewish, and Mohammedan. The old gates, eight in number, are still in existence. The interior of the city is marked by narrow and crooked streets, some so narrow as scarcely to admit of the entrance of light. Compact, without parks and flowing fountains, Jerusalem is a city of walls, of mosques, churches, and synagogues; and, steeped in the golden sunshine, the old sacred center makes a scene most picturesque against the sapphire sky.

Roads lead out from the city in all directions. A railroad has been in operation for some time between Jerusalem and Jaffa; now Jerusalem is connected indirectly by railroad with all of the chief towns of Palestine and with Damascus, and is only a night's ride from Port Said and Cairo. The railways connecting Palestine with other countries were built during the World War by the Germans and the Allies. A modern telephone exchange has been installed and printing works established. Schools and orphanages are numerous, and a nurses' training school and infant-welfare station are maintained. Modern ideas in sanitation are gradually being introduced, and some progress is being made in reducing the insanitary conditions of the old city. In many respects, Jerusalem is a modern city, but its progress is recent, and ancient customs and places still exist side by side with the most Western of importations. The most marked change during recent years has been the influx of many Jews, who now form by far the bulk of the

population. This migration forms part of the Zionist Movement.

Jerusalem suffered loss of property, but no lives, in an earthquake which occurred in Palestine in 1927. In 1929 new golden-yellow limestone walls for the city were completed by British engineers. They have thirty-four towers, and are surmounted by a three-mile walk on their tops.

Related Subjects. The following articles in these volumes contain more detailed information as to certain persons and events mentioned above:

Constantine I	Nebuchadnezzar
Crusades	Olives, Mount of
Cyrus the Great	Palestine
David	Pilate, Pontius
Jesus Christ	Solomon
Jews	Temple
Judea	World War
Maccabees	Zionist Movement

JERUSALEM ARTICHOKE. See **ARTICHOKE**, subhead.

JESSAMINE, *jes' a min*. See **JASMINE**.

JESSE, the father of David (which see).

JESTERS, COURT, sometimes called **COURT FOOLS**, persons formerly maintained in the households of kings, princes, and other dignitaries, to amuse the family. Just when the jesters were introduced into Europe is not exactly known, but they began to be licensed in the seventeenth century. It is supposed that they existed in Britain during the time of the Saxons. Goles, court fool to William of Normandy, is mentioned in a history of the Conqueror. Holbein painted the jester of Thomas More, and in 1728 Swift wrote an epitaph on the Earl of Suffolk's fool, who was buried in Berkeley Churchyard at the age of sixty-three. Will Somers, fool to Henry VIII, was presented to that monarch by Cardinal Wolsey. The jester portrayed by Shakespeare in *King Lear* is famous [see **SHAKESPEARE**, **WILLIAM** (Synopses of the Plays)].

JESUITS, *jez' u its*, or **SOCIETY OF JESUS**, a Roman Catholic religious order which was founded in 1534 by Ignatius Loyola (see

LOYOLA, IGNATIUS OF), and approved by Pope Paul III in 1540. The members are bound by the usual vows of poverty, chastity, and obedience; in addition, they are under oath to render entire submission to Papal authority and are forbidden to fill any of the higher offices of the Church. In the few instances in which Jesuits have been made cardinals or archbishops, it has been at the command of the Pope. The constitution of the order which was drawn up by its founder, with slight modification, is in force to-day. The general aims of the organization, to quote from Catholic authority, are the greater glory of God, the defense of the Roman Catholic faith against heresy, the spread of the religion in pagan countries, and the education of the young.

The order is divided into four classes: *professed fathers*, or *priests*, from whom the generals and the higher officials of the society are chosen; the *coadjutors*, or *helpers*, including the lay brothers who perform the menial offices and minor duties of the institutions; *scholastics*, or *students*, who are preparing for priesthood; and *novices*, who are as yet bound by no vows. Supreme power is vested in the head of the order, the "father general," who is elected for life.

The early development of the society was rapid. It quickly spread through Europe, and was the most forceful influence directed against the rising tide of Protestantism. In this connection it was closely identified with the Counter-Reformation movement (see COUNTER-REFORMATION). But toward the end of the eighteenth century, Pope Clement XIV, yielding to pressure from Catholic opponents of the Jesuits among officials of European governments, suppressed the order in all countries. It was too powerful, however, to suffer more than a temporary eclipse; in 1801 it was partially reinstated by Pope Pius VII, and in 1814 was restored to its former status.

As Educators and Missionaries. The Jesuits have been regarded by Roman Catholics as the leading and most scholarly of Catholic educators. Wherever they located, they es-

tablished numerous schools and colleges. They developed original and highly successful methods of teaching the classics; the quality of their scientific courses is shown by the fact that such great astronomers of the nineteenth century as De Vico, Perry, and Secchi were Jesuits. As a great educational factor, the society reached its climax about the middle of the eighteenth century, when it controlled 728 colleges, with about 300,000 students. It has now about 220 colleges throughout the

world, with possibly 55,000 students. In the United States, it has educational institutions in over twenty cities.

The society is one of the most zealous of all the missionary bodies of the Roman Church, its members hesitating at no sacrifice or danger to spread their religious beliefs. Saint Francis Xavier, the friend and companion of Ignatius, made many converts in remote parts of India and Japan. At a later period, a band of the Jesuits penetrated into the heart of the old Chinese Empire and other heathen nations. In America, Fathers Garnier, Jogues, Lalle-mont, and others were martyrs to the cause. Father Marquette, who discovered the Missis-

sippi River, endured sufferings and hardships during his work among the Illinois Indians in the Mississippi Valley.

The Jesuits have constituted an active factor in the religious and political history of the world. No body of men, with the exception, perhaps, of the Jews, has ever been attacked more vigorously than the Society of Jesus. This opposition, it might be believed, would tend to halt the growth of the order; as a matter of fact, however, persecution has proved to be a preventive of decay. The reported membership is now nearly 21,200.

JESUITS' BARK. See CINCHONA.

JESUS CHRIST, the founder of the Christian religion, the Man who, of all that have lived, has influenced humanity most profoundly. In order to appreciate His influence, one would have to make a study of the relation of Christianity to civilization, and that is impossible here; but to the most casual observer it is evident that civilization has reached its



From the painting by Hofmann

HEAD OF CHRIST



Artists' Impressions. Above, "The Arrival of the Shepherds," picturing the manger in which Christ was born (painting by Lerolle). Below, a priceless object of art, "The Good Shepherd," a gift to the Pope by former Emperor Francis Joseph of Austria-Hungary. It hangs in the Sistine Chapel in the Vatican.



Scenes from the Life of Christ. Above, "Finding Christ in the Temple" (by Holman Hunt). Center, "Casting Out the Money Changers" (by Kirchbuck). Below, "The Miraculous Draft of Fishes" (by Raphael).
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Other Scenes in the Life of Christ. Above, "The Entry into Jerusalem" (by Placido); Center, "The Last Supper" (by Da Vinci); Below, "Christ before Pilate" (by Munkacsy).

Center, "The
Christ before
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highest level in those countries which have come under the sway of Christianity (see CIVILIZATION). He was, in His life, the "Man of Galilee," the simple carpenter of Judea; yet most of the civilized world dates its chronology from His birth, and every use of the familiar letters B.C. or A.D. is a reference to His name.

Biographies of Jesus. There are four books which tell all that is known of the life of Jesus—the New Testament gospels of *Matthew*, *Mark*, *Luke*, and *John*; and all the books upon books which have been written about Him through the ages add nothing, except in the way of conjecture, to what is told in those wonderfully simple narratives. Two of them, the gospel of *Matthew* and the gospel of *John*, were probably written by men who lived in close contact with Him as Disciples, during the last years of His life, the latter gospel being the work of the man who understood and loved Jesus best. The other two gospels, so far as critics can determine, were the work of writers who drew their information from men who had been companions of Jesus. Naturally, since the four authors differed in their temperaments and their interests, they viewed the words and acts of Jesus from different standpoints, and the various gospels place emphasis on different phases of the Teacher's life and works: but while they show this variation, they are in harmony on all essential points. The sketch here merely touches the main events.

Early Years. Time in all Christian countries is counted from the birth of Christ, but when the reckoning began, centuries ago, there was a mistake made, and because of it we are committed to the error of saying that Jesus was born in 4 B.C., or perhaps in 6 B.C. His birth-place was Bethlehem, a little town in that Judea which had once been the seat of a Hebrew king, but was now a Roman province. On the imperial throne of Rome at the time sat the great Augustus, and historians state that, for the first time in centuries, the whole world was at peace and the doors of the temple of Janus in Rome were shut. The mother of Jesus was Mary, wife of Joseph the carpenter, and to her His coming had been announced long before His birth. His name of Jesus, too, which means *help of Jehovah*, or *Saviour*, was chosen for Him thus early. As to the exact day of His birth there has been much controversy, but since the fourth century, December 25 has been honored and celebrated as His natal day.

God rest ye, little children; let nothing you affright,
For Jesus Christ, your Saviour, was born this happy
night;

Along the hills of Galilee the white flocks sleeping lay,
When Christ, the Child of Nazareth, was born on
Christmas day.

—D. M. Mulock.

Miraculous circumstances attended the birth of Jesus, which occurred in the manger of an inn, while Joseph and Mary were in Bethlehem to pay taxes to the Romans. Angels, according to the gospel account, announced the wondrous event to the shepherds, while those who sought for the infant king were guided to His resting place by a peculiarly brilliant star.

All that is known of the childhood and youth of Jesus may be told in very few words. When He was eight days old, He was circumcised, in accordance with the Hebrew law, and a month later He was presented in the Temple at Jerusalem. Meanwhile, the wise men from the Orient had come seeking Him, and their quest had roused the jealousy of Herod, who demanded to know where his rival, this "king of the Jews," was to be found. Because the wise men did not return with the information and he feared he might not find the right child, Herod ordered all the boy babies in and near Bethlehem to be put to death, but Joseph had been warned by an angel in a dream, and had fled with Mary and Jesus to Egypt (see color plate, with article RUBENS). Herod died a few months later, and the little family returned to Nazareth, where Jesus lived until He reached manhood.

One gospel, that of *Luke*, tells of a single incident in the childhood of Jesus—how He was taken to Jerusalem for the feast of the Passover, and astonished the learned men in the Temple by His grasp of spiritual affairs. Save for this, and for the general statement, also made by Luke, that "the child grew and waxed strong, filled with wisdom, and the grace of God was upon Him," there is no comment upon His boyhood days. Legends there are in plenty, but they are not worthy of recognition, and it seems probable that Jesus lived quietly in Nazareth, following Joseph's trade of carpentering, helping to care for the family.

His Early Ministry. When He was about thirty years old, there came a change in His life. There had grown up in Him, no one can tell just how, the positive conviction that He was different from other men, and that therefore His mission was to be different. His work had been prepared for by the powerful preaching of John the Baptist, that "voice of one crying in the wilderness," and to John, Jesus submitted Himself for baptism, quite as repentant sinners had done. That He was not as other men, however, was witnessed by the very voice of God, who claimed Jesus from Heaven as "my beloved Son."

The next step was Jesus' retirement to the wilderness, where He passed a time of inward struggle as to the methods which He should use in His work. On His return from the wilderness, John pointed Him out to certain



"Christ Blessing Little Children." The original was painted by Hofmann. It hangs in a Berlin gallery.

of his followers as the Messiah, and these men transferred their allegiance to Him, becoming His first Disciples. Jesus proved Himself very different from John, for, while the Baptist was an unsocial man who loved solitude, Jesus showed from the first a love for His fellow men and a desire to mingle with them. Thus His first public appearance was at a wedding in Cana of Galilee, and there He helped the host out of his difficulties by turning water into wine. Very striking is His behavior on His visit to Nazareth, His home town, for He did not hesitate to declare in the synagogue, in the presence of those who knew Him, that He was the Messiah of prophecy, the fulfillment of the Scriptures. Then, returning to Jerusalem for the Passover, He made a still more public declaration of His mission by driving from the Temple the merchants and the money-changers.

But, despite the fact that they were deeply impressed, the people showed no tendency to accept Him, and Jesus withdrew from the capital city, passing through Sychar in Samaria, and there holding His noteworthy conversation with the woman at the well. It had become clear to Him that Galilee and not Judea must be the field for His ministry, and He chose Capernaum as the center from which to work. His first act was to choose formally as Apostles, as helpers in His great work of swaying public opinion, Peter and Andrew and James and John. Later, He chose other men until He had twelve—twelve ordinary men to whom He meant to entrust His great work.

Second Year's Ministry. It is impossible to give in detail His movements and works, but certain "turning points" may be noted—events or sayings which marked definite epochs in His life. Having chosen His Disciples, He saw the necessity of giving them special instructions for the work before them, and one of His first acts was the statement of His principles. This "constitution of the kingdom of Heaven," as it has been called, is best known as the *Sermon on the Mount*, and it contains all those principles which, while distinctly at variance with the standards of righteousness of the day in which Jesus lived, have been generally accepted as the essence of morality even by those who deny the divinity of Jesus.

Another "turning point" is to be found in connection with the woman who anointed His feet with the precious ointment, for it was at this time that Jesus claimed the right to forgive sin, and so further enraged the Pharisees, already opposed to His teachings. Many miracles He performed, too, on various tours through Galilee, and these often resulted in discussions wherein Jesus pointed out the worthlessness of that righteousness which consisted merely in forms and ceremonies. And

what was more, He gave to His Disciples, whom He sent out on preaching tours, the power to work the same wonders at which they had marveled in Him.

Separating all that goes before from all that follows, stands Jesus' declaration to His Disciples that He must "suffer many things . . . and be killed." They did not understand it entirely, but He never ceased to feel its influence, and from that time, as Luke says, "He steadfastly set His face to go to Jerusalem." The journey was a slow one, and included stops at more than one city, but Jesus never lost the consciousness that He was going toward His death.

The Last Months. These were of peculiar importance in the work of Jesus, and included such great events as the Transfiguration, such miracles as the healing of the man born blind and the raising of Lazarus, and many of His most significant discourses and parables. It must be kept in mind as a significant fact that Jesus was almost everywhere very popular with the common people, though these misunderstood His mission and believed that He was going to lead a revolution against Rome and bring back the glorious days of the Hebrew kingdom. It was the leaders who hated and feared Him, and who had determined on His downfall, and toward that downfall Jesus was hastening.

Passion Week. Interest centers in this last week of the life of Jesus, which began with that triumphal entry into Jerusalem which testified to the favor, enthusiastic if superficial, which He had gained in the eyes of the people. During the following days, He spent some time in the city, cleansing the Temple for the second time, but long hours were spent in retirement at Bethany. Thursday night He observed the Passover with His Disciples, establishing the Lord's Supper as a memorial of Himself, and shortly was arrested in the Garden of Gethsemane by the chief priests and Pharisees, to whom He had been betrayed by Judas, one of His Disciples. He was examined by the ex-high priest Annas, given a sort of trial by the Sanhedrin, taken before Caiaphas, the high priest, and finally turned over to Pontius Pilate, the Roman governor of Jerusalem, for only the governor could make legal the sentence of death which the Sanhedrin had passed against Him.

Convinced of the innocence of Jesus, Pilate yet allowed the clamors of the Jews, who had turned against their former favorite because He had not reestablished their kingdom, to influence him so far that He gave Jesus over for crucifixion. On a hill outside the city, He was crucified, with a criminal on each side, and after His death His body was taken from the Cross and buried by Joseph of Arimathea and Nicodemus. The Disciples and those



The Crucifixion. A reproduction of the painting by Rubens; it is one of the world's great works of art. The original is in an Antwerp gallery.



The Transfiguration. The original, by Raphael, is classed by art critics as one of the twelve greatest paintings ever produced. It hangs in the Vatican.

women who had remained true to Jesus felt that the end of all things had come—that their hopes had proved vain; but when, on the morning of the first day of the week, some of the women visited the tomb, they found that the stone had been rolled from the door and that the body of Jesus was no longer there.

For forty days after His Resurrection, Jesus remained on earth, holding frequent intercourse with His Apostles and other followers; and finally they were permitted to see Him received up into Heaven. Jesus had in no sense organized the Christian Church, for even the formal preaching of His gospel did not begin until after the memorable day of Pentecost.

Related Subjects. The reader is referred in these volumes to the following articles:

Apostles	John the Baptist
Christmas	Mary
Herod (the Great)	Pentecost
Janus	Sanhedrin

JESUS, LOVER OF MY SOUL (hymn). See HYMNS AND HYMN TUNES.

JET. Near Whitby, in Yorkshire, England, a variety of coal is found that is so hard that it can be carved into almost any form and polished so highly that it resembles black glass. This substance is generally known as *jet*. The most notable deposits are those in Yorkshire, but jet is also found in various places in Germany, France, and Spain. The mineral is used for making buttons and dress ornaments. It was known to the Greeks and the Romans, and the former used powdered jet for toothache.

JETSAM. See FLOTSAM, JETSAM, AND LIGAN.

JETTY, a wall or pier, made of timber and stone, or of stone alone, and built into a river or harbor. Its purpose is to deepen the channel by increasing the swiftness of the current, or to serve as a breakwater. Sometimes jetties are built along the sides of streams to prevent further washing away of the banks. Many open harbors have great walls or banks built into the sea for added protection, such as the jetties of the harbors of Dunkirk and Calais in France, and in Galveston, Tex. The Columbia River on the Pacific coast of the United States has the longest jetty in the world, nearly four and one-half miles in length. Before it was built, the harbor was feared by all sailors, because of the shifting bars; now there is a single channel having a uniform depth of twenty-nine feet.

The Mississippi Jetties. These were built to keep the mouths of the Mississippi from filling up with the silt and fine sand that the water brings down in vast quantities. The river empties into the Gulf of Mexico through four principal mouths, known as *passes*. They are called Southeast Pass, South Pass, Grand Pass, and Southwest Pass. In 1874 these mouths were so choked up with the bars that large steamers

could not get through. Captain James B. Eads (which see) suggested building two long jetties like two walls, along the banks and out into the Gulf. These would keep the water from encroaching on the land, and would force it through a narrower channel



MISSISSIPPI JETTIES

so much more swiftly that the current would scour out the bars and keep the channel clear and of a uniform depth. The South Pass was the first to be improved.

In 1875 the jetties were built. Rows of piles 1,000 feet apart were driven into the bottom to mark the position of the walls, then timber mattresses, made of willow logs fastened with planks, were sunk by piling stones upon them. The bottom layer of mattresses was fifty feet wide, but each layer was made narrower until the top one measured only twenty feet across. These dikes of timber and stones filled up with silt, and sank deeper and deeper into the river bottom until they became immovable. Inside of two years there had been made a channel thirty feet deep, which has been maintained ever since. In 1906 similar jetties were built in the Southwest Pass, and both sets have been repaired and improved several times. See MISSISSIPPI RIVER (Floods); LEVEE.

JEVONS, *jev' unz*, WILLIAM STANLEY (1835-1882), an English philosopher and economist, born at Liverpool, who was the first to simplify logic for the benefit of beginners. He held a position in the royal mint of Australia; was professor of logic and mental and moral philosophy at Owens College, Manchester, as well as Cobden lecturer on political economy there; and subsequently he held the chair of political economy in University College, London. His *Letters and Journals* were edited by his wife in 1886, four years after his death. See LOGIC.

Principal Writings. Jevons' principal works in the field of logic are *Elementary Lessons in Logic*, *The Principles of Science*, and *Studies in Deductive Logic*. His works on political economy include *The*

Coal Question, Theory of Political Economy, The Value of Gold, and Money and the Mechanism of Exchange.

JEWEL CAVE. See MONUMENTS, NATIONAL.

JEWELRY. From earliest days, among the civilized and savage alike, the wearing of jewelry has been a dominant trait, for the passion for display is as old as man. When the savage cannot secure metals and gems, he paints his body for adornment, submits to tattooing, or wears pieces of bone, wood, or iron inserted in the flesh of ear, lip, or nose. Gold and silver ornaments probably date from immediately after the discovery of those metals; on account of its attractive color and the ease with which it can be shaped or "worked," gold has always formed the principal foundation of jewelry.

There is a great difference between modern jewelry and that made by the ancients. Machinery has entirely altered the methods of manufacture. The ancients depended on their hands and such rough tools as could be constructed to produce their effects. Metal was beaten, hammered, and chased; the results were almost invariably harmonious and artistic combinations. In those days there was great opportunity for individuality and originality. In modern jewelry, these have largely given place to conventionality.

Ancient Greek jewelry is remarkable for perfection of form and artistic ornament. Roman jewelry shows more barbaric splendor, while the most beautiful and artistic metal work of ancient times was produced by the Etruscans (see ETRURIA). The period of the Renaissance saw a great improvement in the making of jewelry. Designs became more chaste and artistic, and inlaid work became fashionable. Diamonds and other precious stones were set flat, with a backing of metal. What is now called the rose diamond was introduced in the sixteenth century, and immediately led to a lighter and more graceful setting. The jewelry of the Renaissance, even the jewelry of the Egyptians, executed nearly 3,000 years ago, has never been surpassed in elegance.

The chief centers of modern jewelry manufacture are London, Paris, Vienna, and New York. Of recent years there has been a great increase in the manufacture of jewelry which imitates in its forms the highest grades, to meet the demands of those who cannot afford expensive ornaments. Gold-plated and gold-filled jewelry is manufactured in vast quantities, in conventional designs, while paste in imitation of diamonds, and glass substitutes for other precious stones, set in cheap alloy, are to be found in every jeweler's store.

The wearing of jewelry is very fashionable to-day, and, in general, the same rules apply

to it as to other details of costume. It should be appropriate to the occasion, it should have intrinsic beauty, and it should harmonize with the other items of dress. The wearing of personal ornaments is largely a matter of individual preference, and the wide variety of modern jewelry makes it possible to satisfy every taste. See illustration, page 3673.

Related Subjects. For list of stones and minerals used in jewelry that are described in these volumes, see the article GEMS. For other information, see the following:

Beads	Jet
Birthstones	Platinum
Brooch	Ring
Coral	Silver
Gold	Watch
Ivory	

JEWELS OF THE MADONNA. See OPERA (Some of the Famous Operas).

JEWFISH, the name applied to certain large fish belonging to the sea-bass family. The *spotted jewfish* ranges from two to six feet in length. It is found on both coasts of tropical America north of Florida and the Gulf of California, and about the West Indies. It has a huge mouth and ugly teeth, and feeds voraciously on smaller fish. The *black jewfish*, called *warsaw* by fishermen, is one of the largest fish known, specimens under 100 pounds in weight being rarely seen. Many reach a weight of 500 pounds. This jewfish is found from Charleston, S. C., south to Brazil. Its color is chocolate-brown varying to blackish-gray. Sportsmen enjoy a test of strength with this gamy fish. On the Southern California coast is found the *California jewfish*, also a delight to sportsmen, especially in the vicinity of Catalina Island. This species is brownish with greenish-black blotches. Large specimens reach a length of six feet. L.H.

Scientific Names. The spotted jewfish is *Promicrops itaiara*; the black jewfish is *Garrupa nigrata*; and the California jewfish is *Stereolepis gigas*.

JEWISH CIVIL YEAR. See YEAR.

JEWISH LITERATURE. See HEBREW LANGUAGE AND LITERATURE.

JEWS, the common designation of the descendants of the ancient Hebrews, also known as ISRAELITES. For the older period, the name Hebrew is the correct form, but for the period after the final destruction of national independence, the term JEW, designating a religious body of a common racial descent, is the proper designation. This name is from that of Judah, one of the Hebrew tribes. Judah became a general designation because the tribe of Judah formed the chief factor in the so-called southern kingdom of the Hebrews; and since through this kingdom, surviving the fall of the kingdom of Israel in the north, the Jewish religion was preserved, the term Judah, or Jew, was applied to all those who professed the religion that became known as *Judaism*.

· ANCIENT JEWELRY ·



SIGNET RING -
EGYPTIAN



NECKLACE -
EGYPTIAN



GIRDLE ORNAMENT -
EGYPTIAN



ARM BAND - EGYPTIAN



GIRDLE PIN -
EGYPTIAN



HEADRESS -
EGYPTIAN



SCARAB
BELT BUCKLE -
EGYPTIAN



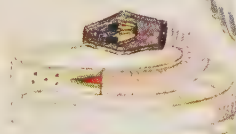
GIRDLE PIN -
EGYPTIAN



CAMEO -
GREEK



IRON NECKLACE -
GREEK



SILVER
BRACELET -
ROMAN



DRESS SPANGLE -
GREEK



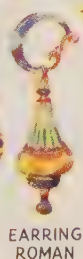
BRACELET -
GREEK



NECKLACE -
GREEK



NECKLACE -
ROMAN



EARRING -
ROMAN



HAIR
PINS -
ROMAN



GIRDLE
CLASP
ROMAN

WEDDING RING -
ROMAN

BRONZE ARM BAND -
GREEK



SIGNET RING -
ROMAN



BRONZE PENDANT -
ROMAN



SMELLING
BOTTLE -
GREEK



Jewelry Worn in Ancient Times. (1) Celtic ornamental jewelry of the Merovingian period (see MEROVINGIANS). (2) Visigothic ornaments from Spain (see GOTHIC, subhead.). (3) Pearl-set pins found in Pompeii (which see). (4) Greek jewelry. (5) Pompeian articles of female adornment. (6) Brooches of gold from Pompeii. (7) Gold breastpins from Pompeii.

The Hebrews belong to the Semitic branch of the human family, but since their dispersion throughout the world, a considerable mixture with other ethnic groups has taken place. Despite the mixture, however, the Jews have retained on the whole their racial identity and many of their physical characteristics. While the dark skin, hair, and eyes predominate among the Jews, there are several other types to be found among them. In ancient times the Hebrews were an agricultural people, but owing to their spread throughout the world and in lands where they were either forbidden to hold landed estates, or where it was impossible for them to do so, they took up commercial pursuits chiefly; and in addition to commerce, they have always distinguished themselves in intellectual and artistic attainments. The Jews have produced, wherever they have settled, a large number of musicians, artists, scholars, and men and women in public life.

The total Jewish population of the world, according to recent Jewish estimates, is 15,630,000, distributed as follows:

Africa.....	500,000
North America.....	4,000,000
South America.....	100,000
Asia.....	1,000,000
Australasia.....	30,000
Europe.....	10,000,000

Early History. The history of the Hebrews proper begins with the organization of a number of related tribes into a united group under the leadership of Moses (which see). Previous to the date of Moses, there were a number of clans forming a part of the later Hebrew Confederacy, of whom merely tribal stories of no particular historical value have survived. These are chiefly interesting because of the picture they unfold of the life of the Bedouins and of the pastoral nomads in early Palestine. The generation that followed upon Moses (1200 B.C.) began to move forward from their settlements in the wilderness around Sinai to the fertile fields on the west, and also to the region east of the Jordan, which was occupied by the Canaanites. Several generations passed, however, before the Hebrews succeeded in dispossessing the Canaanites altogether.

During this period, the tribes, while forming theoretically a confederacy, came together only

for common defense against an enemy. Political necessity, however, led in the course of time to the formation of a kingdom composed of all the tribes, with a permanent ruler to exercise sovereignty over all. The first ruler of this character was Saul, who belonged to the tribe of Benjamin. He was succeeded by David, of the tribe of Judah, and David in turn by his son Solomon, under whom the little kingdom expanded to such an extent as to seem to later generations to have been the very climax in the political growth of the Hebrews. After the death of Solomon, a serious break between the north and the south occurred, which was never repaired.

The northern kingdom became the more powerful of the two, and being also the more ambitious, exhausted its vitality in struggles with surrounding nations and in endeavors to resist the progress of mighty Assyria. The northern kingdom, known as the Kingdom of Israel, fell in 722 B.C. In that year, the capital, Samaria, was taken, and Israel became tributary to Assyria. The southern kingdom survived until the year 586 B.C., when Nebuchadnezzar, king of Babylonia, fired by the martial ambitions of the Assyrian kings, succeeded in bringing all the kingdoms lying to the west of Babylonia up to the shores of the Mediterranean under his control. The city of Jerusalem was stormed, and in accordance with Assyrian and Babylonian custom, a large number of the influential inhabitants of the country were carried away into captivity to diminish the possibility of an uprising.

The Prophets. Before Jerusalem fell, however, a remarkable religious movement had set in under the guidance of a group of men known as the Prophets, who, first appearing in the northern kingdom in the ninth century, extended their influence throughout the north and south. These Prophets set up a new religious ideal. Instead of regarding the national deity known as *Yahweh* merely as the protector of his people, they pictured him as a power ruling by self-imposed laws of righteousness and demanding that his followers should regulate their lives according to high ethical standards. When the Hebrews dispossessed the Canaanites, they adopted many of the religious customs of the country. Against these customs, so far as they involved crude and materialistic conceptions of a divine protector, the Prophets protested, until finally the many sanctuaries, originally sites of Canaanitish worship, which had become centers of the *Yahweh* cult, were boldly denounced as illegitimate, and the claim was set up that Jerusalem alone, in which the cult had been purified of its objectionable elements, should be regarded as the place in which *Yahweh* could be properly worshiped. This revolutionary movement set in during the last half of the seventh century,



Photo: U & U

TYPE OF MALE HEAD

and by the time the destruction of Jerusalem took place, the reformation of the religion in the hands of the Prophets had advanced to such a point as to insure the continuation of the religious ideals of the Prophets, even though the national life was crushed.

The Hebrew Prophets are the real founders of the religion known as *Judaism*, and it was a natural corollary which expanded the national Yahweh into a *Jehovah* of universal sway, father of all mankind, whose control is not limited to any particular country or people.

During the Exile, and more particularly during the century after a semblance of national independence had again been instituted, though under the control of Persian governors, the religious ideas of the Prophets further developed until the time was reached when the Jews became the standard-bearers of a monotheistic religion, with ethical and spiritual ideals that placed it far above the religious standards prevailing in other countries. But as the religion grew in spirituality and in strength, the political life of the Jews (as we should now call them) steadily declined. True, Babylonia itself fell in the year 538 B.C., but the Persians, who, under Cyrus, then came into control, continued the traditions and the policy of both Assyria and Babylonia, though that policy was carried out in a more beneficent and wiser manner and worked less harm to subject peoples.

Cyrus dreamed of a world empire, as did Assurbanipal of Assyria and Nebuchadnezzar of Babylonia, before him. Anxious to conciliate the Jews, he allowed them a certain measure of freedom. In accordance with this policy, he permitted the Jews who had been carried to Babylonia to return to their country, and even granted a form of self-government of the country, though under the supervision of a Persian governor. To the pious Jews, Cyrus became a deliverer, but chiefly because he allowed the rebuilding of the religious center of the people, the great, historic Temple at Jerusalem.

The Dispersal. The Persian rule came to an end in 332 B.C., when Alexander the Great overthrew the empire founded by Cyrus. After the death of Alexander, Palestine fell under the control first of the Ptolemies of Egypt, and then of governors of the Seleucid kingdom. Only a semblance of political independence was permitted the Jews, and soon serious difficulties arose because of the fear on the part of the more pious Jews of complete assimilation between Jews and Greeks. The reaction against this tendency led to a short period of political independence under the control of a family known as the Maccabees. Internal quarrels, however, and the coming of the Ro-

mans soon put an end to any attempts at Jewish independence, and in the year 70 A.D. the city was destroyed by Titus. The result was a gradual dispersion of the Jews throughout the Roman Empire, though it must be borne in mind that ever since the earlier destruction by Nebuchadnezzar, in the year 586 B.C., this movement had really been going on. Indeed, several centuries before our era there were large settlements of Jews in Southern as well as in Northern Egypt,



Photo: Visual Education Service

MUSICAL INSTRUMENTS

Such as were used by the early Jews.

and, in particular, in the district around Alexandria. The Jews, too, at the time of the beginning of the current era, had settled in large numbers in Assyria and throughout Asia Minor, and had crossed over to Italy. The final extinction of political independence, however, lent a further stimulus to the dispersion, and in time Jerusalem became but a sacred memory and an ideal hope to the great bulk of the Jews scattered throughout the world.

The Jews encountered strange vicissitudes in the lands to which they came. In Egypt they attained considerable prominence and wealth, which lasted for several centuries. Large colonies of Jews gathered in Italy and then spread to Spain. At the same time, settlements were made in Northern Africa, and during Mohammedan supremacy in that section and in Spain, the Jews flourished and unfolded a remarkable literary activity. From

Italy and Spain they gradually spread into Southern France, into Germany, and into England, while, on the other hand, from Asia Minor the Jewish dispersion crossed over into Southwestern Europe and made its way to the Crimea and into Southern and Central Russia. These two waves of migration, one spreading over Western Europe toward the east, and the other from Asia Minor across Southeastern Europe toward the north and west, met in Russia, which became the very center of Jewish settlements, comprising, until recently, considerably more than half of the entire Jewish population of the world (see RUSSIA).

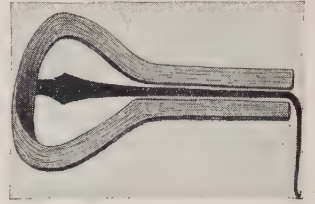
Persecutions. Restrictions and persecution often drove the Jews from one country to another. Driven out of Spain, after enduring unutterable hardships and after a thousand had been burned at the stake, thousands upon thousands passed northward into France and Holland, or moved to the east in the Balkan states and other sections of Southeastern Europe. Enduring persecutions at various times in Germany, they nevertheless maintained themselves there. With the discovery of America at the end of the fifteenth century, and with permission to settle in England, which was given about the middle of the seventeenth century, a better era dawned for this ancient people. Gradually, Europe awoke to the necessity of a thorough political reorganization, which led, as an inevitable consequence, to the political rehabilitation of the Jews in all countries. In Russia, especially, is their lot improved, for the revolution of 1917 brought them prominently into governmental affairs. In all the countries in which Jews have received the right of citizenship, they have shown themselves to be thoroughly loyal, contributing their full share toward the social, political, intellectual, and artistic advance of the lands in which they live. c.w.

Related Subjects. The sketch of the Jews here given may be supplemented by the following articles in these volumes, and by the biographies of the famous men listed under the article BIBLE:

Bedouins	Maccabees
Bible	Nebuchadnezzar
Cyrus	Nomad Life
Hebrew Language and Literature	Palestine
Jerusalem	Semites
Judea	Temple
	Zionist Movement

JEW'S-HARP, a small musical instrument, deriving its name, according to some authorities, from the French word *jeu*, meaning *play*, from the fact of its being a toy. More probably it was named in ironic allusion to the harp of David. The instrument comprises two narrow metal prongs, open at one end and rounding into a circular form at the other end. To the latter is attached a flat spring

which passes along between the prongs, terminating in a short section bent at a right angle. The prongs are held between the teeth, away from the lips, and the sound is produced by inhaling and exhaling air from the lungs, while the player strikes the upright spring with the finger. The device is an old one, being mentioned in 1619 by Praetorius, a German composer and writer, in his *Organo-graphia*, under the name of *crembalum*.



JEW'S-HARP

JEYPORE, *ji pore'*, or **JAIPUR**, *ji poor'*. See INDIA (The Cities).

JEZEBEL, *jez' e bel*, the wife of Ahab (which see).

JHELUM, *ja' lum*, RIVER. See KASHMIR.

JIBUTI, *je boo te'*, the capital of French Somaliland. See FRENCH SOMALILAND.

JIG, a national folk dance of Ireland. See DANCING.

JIGGER, **CHIGGER**, OR **CHIGOE**, *chig' o*. These names are applied to a species of flea that is very annoying to man in the tropics, and they are also used in the United States for certain members of the mite tribe, that irritate the flesh of vertebrate animals. The jigger flea is somewhat smaller than the common flea, but has a proportionally larger head. When about ready to lay her eggs, the female works her way into some exposed part of the victim's body, such as the feet, and lodges beneath the skin. The presence of the flea is indicated by an unbearable itching, and if the insect is not removed with a needle or knife point before the eggs are released, serious ulceration results. A related species attacks chickens in the Southern United States.

The jigger mites of fields and woods that make life miserable for campers, hikers, and others are more correctly known as *harvest mites*. These minute red creatures, too small to be noticeable, are the six-legged larvae of certain species of mites that in the adult form prey on insects and their eggs. The jiggers enter the skin through the hair follicles and oil glands, setting up an itching that induces the victim to scratch himself sore. It is probable that the mites remain on the skin for some time before they work their way in.

One can ward off the painful effects of the bites by bathing the parts with water solutions of salt, soda, or ammonia. Kerosene or carbolized oil (five per cent strength) will kill jiggers; their bodies may then be extracted with a sterilized knife point or blunt needle. Flour of sulphur or naphthalene, dusted on the underwear, shoes, and hose, will prevent

jigger bites, for these substances are repellent to mites.

S.H.S.

Scientific Names. The scientific name of the tropical jigger flea is *Sarcopsylla penetrans*. Jigger mites belong to the family *Trombididae* and the genus *Trombidium*. They are not insects, but arachnids (see MITES; ARACHNIDA).

JIMSON WEED. See STRAMONIUM.

JINGO, in modern politics, the name given to a party or to an individual displaying a blustering, warlike policy or attitude. The term was particularly applied in British political history during the Beaconsfield administration (see DISRAELI, BENJAMIN), 1874 to 1880, when the English government was hesitating over the policy of interfering in the war between Russia and Turkey. The epithet originated in the chorus of McDermott's *War Song*, first sung in a music hall in London, which expressed the jingo or war spirit of the Conservative party headed by the Earl of Beaconsfield:

We don't want to fight;
But, by jingo, if we do,
We've got the ships,
We've got the men,
We've got the money, too.

In America the term expressing the same idea of boastfulness is *spread-eagleism*, and the bombastic war spirit is called *jingoism*.

JINNS. See GENII.

JINRIKISHA, *jīn rik' e shah*, also spelled JINRIKSHA, is the name of a light, two-wheeled, hooded vehicle drawn by one man. A cross-piece is attached to the outer end of the shafts, which enables the runner to pull the conveyance. The *hiki*, or puller, travels long distances at a brisk pace, frequently covering from twenty to thirty miles a day, and arriving at his destination apparently little fatigued by his exertions.

The jinrikisha has been the most dependable and the most popular means of city transportation in China and Japan for many years, but it is rapidly disappearing from city streets, for the advent of the automobile has rendered jinrikisha service very dangerous on the crowded thoroughfares.

This vehicle was invented in 1869 by an American Baptist minister named Goble;



THE JINRIKISHA

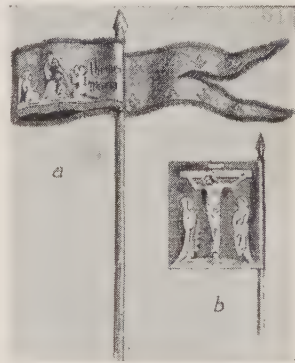
early in the same year, a Japanese improved the crude original form by supplying springs and adding an overhead hood and wheel guards.

JIPIJAPA, *he pe hah' pah*, a fiber from which Panama hats are made. See COLOMBIA (Mining and Manufactures).

JIUJITSU, *joo jit' soo*. See JUJUTSU.

JOACHIM, *yo' a keem*, JOSEPH (1831-1907), an Hungarian violinist and composer, considered the greatest master of technique of his period, was born at Kittsee, near Pressburg, of Jewish parents. He made his first public appearance at the age of seven, after which he studied under distinguished masters at Vienna and Leipzig. At the age of eighteen he was appointed leader of the grand duke's band at Weimar, but left this post owing to a disagreement with the composer Liszt. From 1854 to 1866, he was conductor of concerts and was solo violinist to the king of Hanover, and in 1868 became head of the Royal School of Music at Berlin. His most important work is the *Hungarian Concerto in D Minor*; his other compositions include overtures, marches, trios, ballads, and various forms of chamber music. Joachim was the founder of a quartet which gained an enviable reputation. As a soloist, he was called the king of violinists.

JOAN OF ARC, *jone uv ahrk*, SAINT, the popular designation of JEANNE D'ARC, a gentle peasant girl who led the soldiers of France to victory at the siege of Orleans, thereby winning the honorary name *Maid of Orleans*. She was born in the village of Domremy, France, in 1412. While her brothers and sisters were sent out into the fields with their father, the mother kept Joan at home for the spinning and weaving. She was not taught to read and write, but she learned all that her mother could teach her of sacred things, and she grew to strong and comely girlhood, known throughout the village for her gentleness, her charity, and her piety. This pure and innocent young girl was driven by visions, revelations from heaven she believed them to be, to leave her family and to make her way to the court of the king of France, Charles VII, then uncrowned. Dressed in her clumsy, red, peasant



BANNER AND STANDARD

(a) Joan of Arc's banner; (b) her standard.



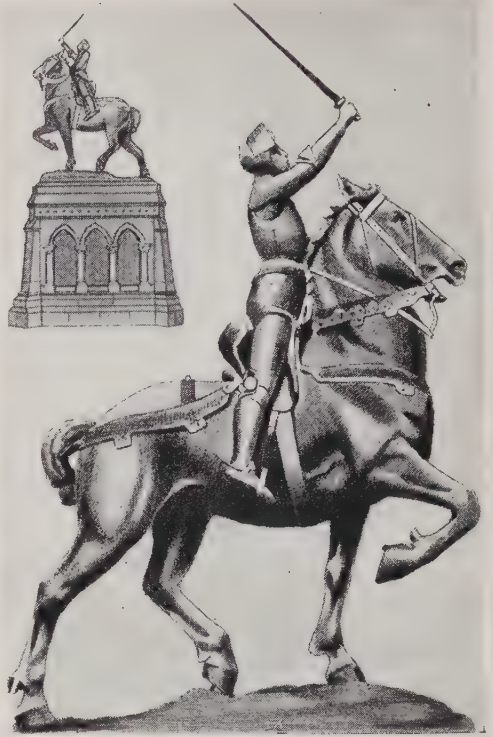
From the painting by Nikalo

JOAN OF ARC

A reproduction of one of the most popular of the world's paintings portraying the peasant girl who led the armies of her king.

garments, Joan presented herself humbly to the king, who received her with great ceremony, probably with the idea of disconcerting her, but she finally prevailed upon him to accept her as the rescuer of France.

The Peasant Maid Leads an Army. Clad in full armor, with sword and banner, Joan of Arc was mounted on a charger at the head of the French troops. For many weary years France had been divided against itself. English kings had fought unceasingly for possession of the French throne, and France had taken sides for and against them. The rough captains and soldiers of King Charles acknowledged no supreme authority, not even that of the king himself, but they bent the knee to this young girl. Fired by her courage and high enthusiasm, they marched on Orleans and raised the siege. They defeated the English in four other engagements and then marched to Rheims, where Charles was crowned king of France, Joan standing at his side, in that



AN AMERICAN STATUE

Erected in 1915 on Riverside Drive, New York City. The pedestal was made in part from eighteen tons of stone brought from the dungeon at Rouen, from which Joan was led forth to martyrdom. The statue is of bronze, twenty-five feet in height, and weighs 8,000 pounds. It is the work of Anna Vaughn Hyatt. Her niece, Clara Hunter Hyatt, posed in armor for the figure. The total cost was \$35,000, raised by popular subscription.

cathedral which was damaged almost five hundred years later by German gunfire in the World War.

The Great Leader Captured. This ended her mission, and Joan wished to return to the little hamlet where she was born, but Charles refused to consent to this. Not again, however, did the valiant girl know victory. In leading the attack on Paris, a shining mark in her armor for the English arrows, she was badly wounded, and on May 23, 1430, was captured by the Burgundians, French soldiers who were allied with the English. They sold her to the English for 16,000 francs (a sum slightly exceeding \$3,000).

The English were not satisfied with her mere capture. Their fear of her was great, because of the adoration with which the French people regarded her. They were determined that she should die. So, after a long imprisonment, during which the young girl suffered humiliation and insult, Joan was tried as a witch and



Photos. Visual Education Service

DRAMATIC INCIDENTS IN THE LIFE OF JOAN OF ARC

Condemned to death, and ready for the supreme sacrifice. Return to Orleans with the victorious army.
(See, also, illustration under HUNDRED YEARS' WAR.)

a heretic, because she had said that her mission had been revealed to her in visions from heaven. She was condemned to be burned at the stake.

Died a Martyr's Death. Ten thousand men stood in the market place at Rouen on May 30, 1431, and saw Joan of Arc face her terrible death with unflinching courage. And "ten thousand men wept" at the dreadful sight. An English soldier or two tried to laugh, but one of the secretaries of the English king said, as he turned from the terrible scene, "We are undone; we have burned a saint." The final taunt of the English was to refuse her ashes burial. They were gathered up and thrown into the Seine River. In 1456 the young martyr was formally pronounced innocent of the charges brought against her, and in 1909 she was beatified by Pope Pius X, the initial step in the process of canonization in the Roman Catholic Church; in 1919 she was declared a saint of that Church.

Her Memory Lives. There is scarcely a figure in all history that makes a greater appeal to the imagination than does this simple country girl. Many are the historical biographies that have been written about her short life, and she is the subject of innumerable poems and stories, plays, pictures, and statues. Schiller and Lomet wrote tragedies based on

her life; there is an historical drama by T. Taylor, an opera by Balfe, and an historical novel by Mark Twain. The English poet Southey published his poem, *Joan of Arc*, in 1796. *Saint Joan* is a play by Bernard Shaw.

The cottage in which she was born still stands, preserved as a monument to her memory. Within is a copy of a beautiful statue of her, done by Marie d'Orleans, daughter of Louis Philippe. The spot in the market place in Rouen where she met her death is also marked by a statue. Another beautiful figure of her stands in the Place des Pyramides, in Paris, and there are monuments to her memory in countless towns and villages in France. The Metropolitan Museum in New York contains a beautiful painting of the Maid of Orleans by Bastien Lepage, and the Art Institute of Chicago has a great canvas by Boutet de Monvel, the French artist who painted the six panels illustrating the career of "La Pucelle" for the church built to her memory at Domremy, her birthplace. On Riverside Drive, New York City, a great equestrian statue of Joan was placed in 1915.

Related Subjects. The reader is referred in these volumes to the following articles:

Charles (VII, France)
France (History)

Hundred Years' War
Rheims

JOB, *jobe*, according to the Biblical narrative, was a wealthy chieftain living in the land of Uz about three centuries before Christ. His faithful spirit was sorely tried not only by the loss of his family and all his possessions, but also by having a serious disease attack him. Satan, who thought that Job's pious nature was a result of his prosperity, was permitted to try him by these misfortunes, but he remained steadfast in his allegiance to God in spite of his wife's tempting him to "curse God" and end his suffering. In the midst of Job's hardships, three friends, Eliphaz, Bildad, and Zophar, appeared to tell him that all his trouble was the result of sin, but, although he bewailed his suffering and wondered at God's plan, he insisted that he had done nothing to merit it. Finally he decided that some time everything would be made right (*Job* XIX, 25-26), and he was restored to more than his original prosperity, living 140 years in happiness.

In the Campo Santo, Pisa, is a series of six frescoes representing various periods in the life of Job, from the time he was a chieftain in Uz until his return to prosperity. Although it was long attributed to Giotto, Volterra is now considered the sculptor who did the work, in 1370.

A Modern Reference. The patience with which Job endured afflictions has become proverbial. Falstaff says, in the second act of *Henry IV*, Part II, "I am as poor as Job, my Lord, but not so patient." To-day, when a person is not amenable to discipline, it is common to say that such delinquencies would "try the patience of Job."

Book of Job. This is an ancient Hebrew poem forming one of the books of the Old Testament. Although the date of writing is unknown, it must have been soon after the death of Job, who is the hero of the story. The book teaches that trust in God will bring events to happy conclusions, even though they may appear all wrong for a time, and that afflictions are not necessarily the result of sin.

JOB'S-TEARS. See BEADS.

JOCASTA, *jo kas' tah*. See OEDIPUS.

JOEL, the son of Pethuel, or Bethuel. "His name signifies *Jehovah is God*. Nothing is known of his birthplace or of his life, except

that he prophesied in Judah. He is classed as the fourth of the twelve Minor Prophets, but he probably was not a priest.

The Book of Joel. This has been said to date from the century between Ezra and Alexander the Great, although later opinion assigns it to the generation following the Macabean age. The prophet and his book are placed by some as early as the ninth century B.C. The records of no one period account for the allusions mentioned in it.



Sculptor: Zettler

JOB

JOFFRE, *zhō' fr'*, JOSEPH JACQUES CÉSAIRE (1852-), commander in chief of the French armies in the World War until the fall of 1916, and thereafter marshal of France and leading military adviser. When, in 1911, his appointment to the highest military position in the republic was announced, few had ever heard of him, but a long career of efficient military service had prepared him for this important position.

General Joffre's parents were working people at Rivesaltes, in the Eastern Pyrenees. They sent him to Paris at the age of fifteen to prepare for entrance to the Polytechnic, the great military school of France. As a student he was not brilliant, but he was a hard worker and was not content until he had thoroughly mastered his subjects.

In 1869 he entered the Polytechnic, and one year later, when not quite eighteen years old, he entered the army which defended Paris in the Franco-German war. That he fought for a lost cause and saw his country in the sad plight of a defeated people must have made a deep impression on the young man, but of it he gave no sign. His work occupied his whole thought and to it he devoted all his energies.

After the war of 1870, he returned to school, and in two years was graduated as a lieutenant. He entered the corps of engineers and began the work which, though not spectacular, was the foundation of his future greatness. "Method is the mother of great achievement," was his favorite saying; and to method he added untiring energy and great honesty of purpose. His rise was gradual, but steady, and it was always due to solid merit rather than to influence or self-advertising.

His success in breaking the wave of German invasion at the Battle of the Marne, in September, 1914, when the Germans expected to enter Paris within a week, gained him the complete confidence of the French people, and



Photo: Brown Bros.

MARSHAL JOFFRE

The resourceful leader of the allied forces in one of the most critical moments of the world's history.

his subsequent conduct of his armies won him the admiration of the world. His soldiers gave him the affectionate nickname "Papa Joffre" because of his interest in their welfare, and the assurance which his calm presence always afforded them. He was decorated with the Cross of the Legion of Honor, and was the dominant French leader, next to Foch. In May, 1917, he and Minister Viviani, with numerous assistants, were sent to the United States by France to confer with the American government relative to coöperation during the war. In December, 1918, he was elected one of the "forty immortals" in the French Academy. See WORLD WAR.

JOHANNESBURG, *yo hahn' es burg*, the largest and most modern city of South Africa, is situated in the Transvaal province of the Union of South Africa. It is the central point of Witwatersrand, one of the richest gold-field districts in the world. The city is connected by railway with Cape Town, Port Elizabeth, Pretoria, Durban, and Delagoa Bay. Johannesburg was founded in 1886 on a desolate plateau, 5,770 feet above sea level, by foreigners who came in search of gold. It was the seat of the Uitlander hostility which led to the war with Great Britain, but was captured by the British troops under Lord Roberts in May,

1900. Population, 155,000 white people, and about 100,000 natives. See SOUTH AFRICAN WAR; UNION OF SOUTH AFRICA.

JOHN (about 1167-1216), king of England from 1199 to 1216, is remembered principally as the reluctant signer of the famous *Magna Charta*, the first great document embodying the principles of English liberty. He was the youngest son of Henry II, who called his son *Lackland*, probably because John was left without a portion when his father divided his dominions among his elder sons. John was appointed king of Ireland in April, 1185, but ruled so badly that he was recalled six months later. On the death of his brother Richard, in 1199, John became king, although several French provinces declared that Arthur of Brittany was the rightful heir to the throne. A war followed, in which John lost, to Philip Augustus of France, Normandy, Touraine, Anjou, Maine, and Poitou.

A serious quarrel with the Pope began in 1205, regarding the election to the see of Canterbury, to which Stephen Langton had been nominated by the Pope. Innocent III suspended the religious privileges of the whole kingdom, and in 1212 issued a bull deposing John. Before Philip of France delivered the decree, John made abject submission. John's methods of arbitrary rule, constantly growing more unendurable, led to a rising of the nobles of his court, and he was forced to sign the Great Charter, June 15, 1215, at Runnymede, a meadow on the banks of the Thames. John obtained an edict from the Pope annulling the charter, raised an army of mercenaries, and commenced war. The crown of England was offered to the dauphin Louis by the despairing barons, and he was received as lawful sovereign in 1216. The outcome was still doubtful when John was taken ill and died.

Related Subjects. The reader is referred in these volumes to the following articles:

England (History)	Magna Charta
France (History)	Philip (II, France)
Innocent (III)	Richard (I, England)

JOHN, the name of twenty-three Popes of Rome, who ruled between A.D. 523 and 1415. Among them the following are worthy of special notice:

John I, Pope from 523 to 526, succeeded Hormisdas. He was compelled by Theodoric, king of Italy, to visit Emperor Justin II, at Constantinople, in regard to an imperial edict against the Arians, an heretical body in the Church. His mission failing in the desired result, he was imprisoned by Theodoric upon his return, and soon died.

John XII, Pope from 955 to 964, was elected when only eighteen years of age. In 962 he crowned Otto I, who, as emperor of the Romans, revived the title borne by Charlemagne (see HOLY ROMAN EMPIRE). Otto deposed John in 963, but the latter returned to Rome afterward, and displaced Leo VIII, Otto's appointee (antipope).

John XIX, Pope from 1024 to 1033, was a Roman of the family of the Counts of Tusculum. He succeeded his brother, Benedict VIII. John crowned Emperor Conrad II in the presence of the English king, Canute.

John XXII (JACQUES D'EUSE), Pope from 1316 to 1334, was a learned theologian, who was zealous in spreading the faith, and he was also skilled in medicine. He excommunicated Louis of Bavaria, and favored Robert, king of Naples, who, after being crowned emperor, deposed John. The Pope collected large sums of money for the Church, but his own life was simple and self-denying.

John XXIII (BALTASSARRE COSSA), Pope from 1410 to 1415, was of a noble Neapolitan family. He called the Council of Constance, by which he was deposed. He fled, but was imprisoned; after four years he was released and appointed dean of the Sacred College by his successor, Martin V.

JOHN, GOSPEL OF. See GOSPELS.

JOHN, KNIGHTS OF SAINT. See KNIGHTS HOSPITALERS OF SAINT JOHN.

JOHN, SAINT. See APOSTLES; DONATELLO, illustration.

JOHN BROWN'S RAID. See BROWN, JOHN.

JOHN BROWN'S BODY, one of the popular marching songs of Federal soldiers in the War of Secession, having for its theme the tragic events connected with the career of John Brown (which see), culminating at Harper's Ferry. It remained in favor in the North for many years after the close of the war. One may understand its vogue during and after the great rebellion if he realizes that it held a place in the hearts of the soldiers of that period comparable to the popularity in the World War period (1914-1918) of "It's a Long, Long Road to Tipperary," "You're in the Army Now," and "Over There."

JOHN B. STETSON UNIVERSITY. See FLORIDA (Education).

JOHN BULL. See BULL, JOHN.

JOHN DAY RIVER. See OREGON (Rivers).

JOHN DORY, the name of a group of fishes of the Old World tropical seas. In body structure, it is like the bass, but long, ribbon-like projections from the dorsal fin give it a strange appearance.

JOHN F. SLATER FUND. See EDUCATIONAL FOUNDATIONS.

JOHN III, OR JOHN SOBIESKI, *so byes' ke*, (1624-1696), king of Poland, a warrior and statesman who, as a military leader, was successful in keeping the Turks out of Western Europe and preserving, in his time, the national life of Poland. His service for his country against the Russians, Swedes, and Transylvanians was so distinguished that in 1667 he was made commander in chief of the Polish army. His two most important victories were won against the Turks, the first at Khotin, in 1673, the second at the siege of Vienna, in 1683. Upon the death of the king, Michael Wisniowiecki, whose part in an un-

popular treaty had brought about the Battle of Khotin, Sobieski was crowned king of Poland as John III (1674), and his wife was crowned queen. See POLAND (History).

JOHNNIE CRAPAUD, *kra po'*, France personified. See BROTHER JONATHAN.

JOHNNY APPLESEED. See OHIO (Agriculture); MICHIGAN (Agriculture); APPLE.

JOHN OF BRUGES, *broo' jez.* See EYCK, VAN (Jan van Eyck).

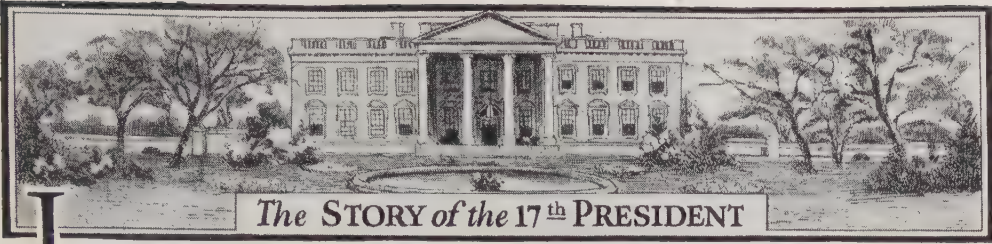
JOHN OF GAUNT, *gahnt*, or *gawnt*, DUKE OF LANCASTER (1346-1399), an English soldier and nobleman, fourth son of Edward III and father of Henry IV. He was born in Ghent, Flanders, from which his name is derived, was created Duke of Lancaster in 1362, and fought in the French wars under his brother, the Black Prince. He was a friend of the poet Chaucer and supported John Wycliffe, the reformer, in his contest with the English clergy. About half a century after the death of John of Gaunt, one of his descendants, Henry VI, representing the House of Lancaster, was deposed by the leaders of the rival House of York, thus bringing on the Wars of the Roses. See ROSES, WARS OF THE; LANCASTER, HOUSE OF.

Literary Reference. In the play *Richard II*, Shakespeare introduced John of Gaunt as one of the prominent characters.

JOHNS HOPKINS UNIVERSITY, an educational institution of high rank, incorporated in 1867 at Baltimore, Md., and formally opened in 1876. Its permanence was assured by the generosity of Johns Hopkins, a prosperous merchant of the city, and the great school was named for him. On his death, in 1873, he left a fortune of \$7,000,000 to be devoted to the founding of a university and a hospital; the latter was opened in 1889. Johns Hopkins University is of outstanding importance among American institutions especially devoted to research work, and is famed for its postgraduate and medical departments. Students admitted to the medical school must hold a bachelor's degree or its equivalent; women are admitted to study on equal terms with men. For the encouragement of research work, the university offers annually a large number of scholarships and fellowships.

When the institution was opened, a temporary location in the heart of the city was chosen, but in 1902 a 125-acre suburban site was secured by gift, and the university was presented with an endowment of \$1,000,000 by the citizens of Baltimore. Plans for the new campus and buildings were then worked out. By the autumn of 1916 it was possible to transfer the greater part of the university to the new site.

JOHN SOBIESKI, *so byes' ke.* See JOHN III; POLAND (History).



The STORY of the 17th PRESIDENT

JOHNSON, ANDREW (1808-1875), an American political leader and statesman. He was elected Vice-President of the United States in 1864 and succeeded to the Presidency on the death of President Lincoln, becoming the seventeenth President of the United States, and the third Vice-President to succeed to the higher office through the death of the Chief Executive. On him fell one of the greatest burdens which any President has ever borne, the problem of reconstruction of the Southern states. He shouldered the load with courage and a desire to do right, and pursued a moderate course, but he met opposition from a party which was controlled by strong partisans. The attempt to remove him from the Presidency by impeachment was generally regarded, even before his death, as ill advised, and if for no other reason, Johnson deserves to be remembered for his defense of the independence of the Chief Executive. If Johnson had been convicted, the President of the United States might thereafter have been more nearly a figurehead than a powerful force.

Personally, Johnson had great faults. He was tactless and he frequently used extreme language; yet his career proved him a man of extraordinary ability. Lacking in education, always a "backwoodsman," he rose to high rank, and, with the single exception of the Presidency, wholly through his own talents and iron will.

Andrew Johnson was born at Raleigh, N. C., on December 29, 1808. His father and mother, like Lincoln's parents, were very poor, and when the father died, in 1812, his widow was left practically penniless. Andrew, therefore, was put to work as soon as possible. At the early age of ten, he was bound out as a tailor's apprentice, and after serving for six years, set up on his own account as a journeyman tailor at Laurens Court House, S. C. In 1826 he removed to Greeneville, in Eastern Tennessee, where he again opened a shop.

More important was the fact that here he met Eliza McCardle, whom he married on May 27, 1826. Johnson was not yet nineteen years old, and his bride was only seventeen, but they were both exceptionally mature, even for a region which encouraged youthful independence. Mrs. Johnson, a woman of refinement, was socially and intellectually the supe-

rior of her husband, but she always remained devoted to him. Johnson's marriage was the means of starting him on the upward path. As a boy he had enjoyed no schooling. With much labor he had taught himself to read after some of his fellow tailor-apprentices had taught him the alphabet. His wife taught him to write and to do simple problems in arithmetic, and while he sewed and stitched during the day, she read to him.

[A biography of the wife of the President appears at the end of this article.]

A Leader in Local Politics. At that time Tennessee was ruled, politically and socially, by the great landowners. Greeneville itself was controlled by an "aristocratic coterie of the quality," as it was called. Johnson, when only twenty years old, organized a workingmen's party in opposition, and was elected alderman. He was twice reelected, and then served as mayor for three years. In the meantime, in order better to qualify himself for a public career, he was taking an active part in a local debating society, most of whose members were students at Greeneville College. In 1835 he proposed himself as a Democratic candidate for the Tennessee house of representatives, and was elected. His opposition to a bill for internal improvements caused his defeat for reelection in 1837, but the reaction and the hard times which followed the panic of that year justified his action and restored his popularity. He was returned to the legislature in 1839, made a state-wide reputation as a campaign orator for Van Buren in 1840, and in the next year was chosen to the state senate. Here he distinguished himself by proposing that the basis of representation in the legislature should be the number of white voters alone, regardless of the number of slaves.

A Wider Political Field. Up to this time, Johnson was practically unknown beyond the boundaries of Tennessee. He was then thirty-five years old, had been in politics for fifteen years, and had become the recognized political leader of Eastern Tennessee. In 1843 he entered a new field, a decade of service in the United States House of Representatives. In Congress he was a conspicuous supporter of Polk's administration, particularly on the Oregon boundary dispute and the question of war

with Mexico. He approved the Compromise of 1850 as a matter of expediency, but as a general proposition, opposed all compromise as a sacrifice of principles. He urged the adoption of a homestead law and low tariffs, and

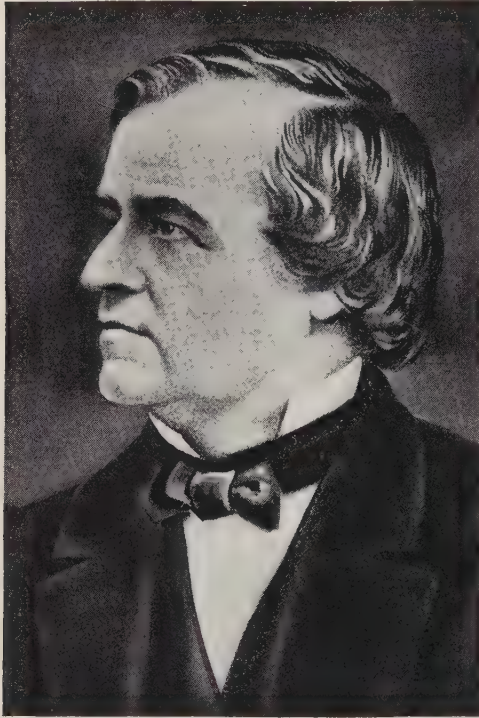


Photo: U & U

ANDREW JOHNSON

Johnson was a Democratic Vice-President under the Republican Lincoln—a choice designed to emphasize the coöperation of parties which it was thought the times demanded. Of Johnson, Woodrow Wilson wrote as follows, in his *History of the American People*: "Mr. Johnson was a man who, like Mr. Lincoln himself, had risen from very humble origins to posts of trust and distinction; but his coarse fiber had taken no polish, no refinement in the process. He stopped neither to understand nor to persuade other men, but struck forward with crude, uncompromising force for his object, attempting mastery without wisdom or moderation."

consistently opposed the policy of internal improvements. In 1853 the Tennessee Congressional districts were rearranged in such a way that Johnson's district was overwhelmingly Whig. Instead of vainly seeking reelection, he announced himself as a Democratic candidate for governor, and was easily elected. He was an excellent governor. Himself an uneducated man, he became a champion of free public schools. He continued to urge the passage of a national homestead law and other measures for the benefit of the poorer classes.

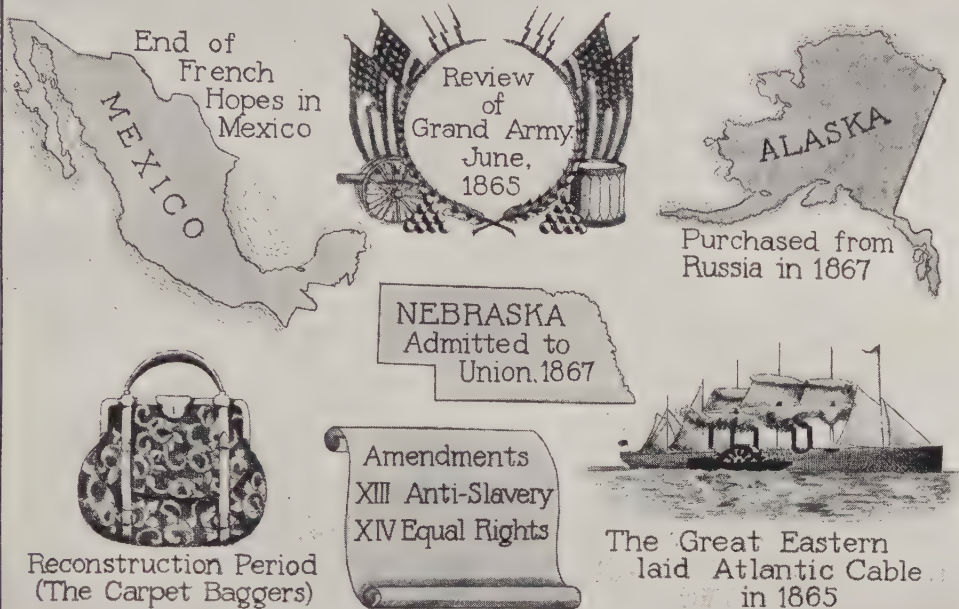
Slavery and Secession. In 1857, after serving four years as governor of Tennessee, John-

son was elected to the United States Senate, where he was almost alone in his peculiar views on the great issues then under discussion. He did not, as has been said, believe in compromises, but it is interesting to note that his own views on political issues were moderate, and he usually occupied a middle ground. Thus he regretted the political power of the slave-owners, but opposed the anti-slavery agitation because it threatened danger to the Union. He voted to admit free California, but, on the other hand, felt that the territories should be allowed popular sovereignty and that Congress should protect the institution of slavery wherever it already existed. His Unionism, on the one side, and his defense of slavery, on the other, suggested his availability as a compromise candidate for the Presidency in 1860, and in the Democratic convention he received the vote of Tennessee. But when the convention split, Johnson withdrew his name and supported John C. Breckinridge.

Until the autumn of 1860, he seems to have believed that any organized attempt at secession was impossible, but once undeceived, he left no doubt as to his own position. He was the only Southern member of Congress who refused to secede with his state. In a fiery speech before the Senate, he announced his intention to stand by the Constitution, and on March 2, 1861, he said, referring to the secessionists, that he "would have them arrested and tried for treason, and if convicted, by the eternal God, they should suffer the penalty of the law at the hands of the executioner." At Liberty, Va., on his way from Washington to Tennessee after this speech, he was attacked by a mob, which he held off with his pistol, and at other places he was hissed and hanged in effigy. A calmer attitude succeeded this intense feeling.

One year later, on March 4, 1862, President Lincoln appointed Johnson military governor of Tennessee. It was a position of great difficulty, in which he showed moderation and restraint. His rule opened the way to the return of Tennessee to the Union, and in March, 1864, the state, under Johnson's orders, elected officers. Johnson's work had made him a national figure, perhaps the most conspicuous of the War Democrats. There was a general feeling at the Republican convention in 1864 that the sacrifices of the War Democrats demanded recognition, which the convention gave by nominating Johnson for Vice-President on the ticket with Lincoln. In the light of later events, it is important to note that in accepting the nomination Johnson explained that his acceptance did not involve a departure from Democratic principles, but was due to "the higher duty of first preserving the government."

1865-JOHNSON'S ADMINISTRATION-1869



Lincoln and Johnson were elected, and were duly inaugurated on March 4, 1865. Johnson was just recovering from an illness, and to strengthen himself for the ordeal of inauguration, had taken several drinks of strong liquor. In his weakened condition, the stimulation was greater than he had expected, and when he came to deliver his inaugural address, he was somewhat undignified and incoherent. His explanation was later generally accepted as satisfactory, but the incident was extremely unfortunate, for it created an unfavorable impression of the man, and was the basis of charges that he frequently drank to excess.

Administration of Andrew Johnson, 1865-1869. Lincoln and Johnson were inaugurated on Saturday, March 4; six weeks later, on Saturday, April 15, Lincoln died, a victim of the assassin's bullet. Johnson thus succeeded to the Presidency, and on the same day was sworn in by Chief Justice Chase. It was supposed that the new President would be harsh and vindictive toward the South. He was known to be bitter against the Southern aristocracy, and he had protested against the generous but just terms of surrender granted to Lee by Grant. Barely a month elapsed, however, before the public saw evidences of a change in the President's views, a change which was due partly to the sobering effect of re-

sponsibility and partly to the influence of William H. Seward, who remained in Johnson's Cabinet as Secretary of State.

The Beginning of Reconstruction. During the first six months of Johnson's term, Congress was not in session, and long before December, when it met, it was apparent that the President had adopted Lincoln's policy of leniency. On May 9, 1865, he issued a proclamation restoring Virginia to the Union, and on May 29 declared a general amnesty to all except fourteen specified classes of citizens. Between May 9 and the middle of July, the President also appointed seven provisional governors, whose duty it was to reorganize the state governments recently in the Confederacy. The reorganized governments at once passed stringent laws relating to the negroes, whose position, according to the radical Republicans in Congress, became worse than ever before. When Congress met, the Republicans were in a large majority, and opposition to Johnson's plan of reconstruction increased because it was almost certain that the Southern Congressmen, if admitted, would vote with the Democrats. There was also a feeling that the Southern leaders had not been sufficiently punished, and many of the Northern members were angered at the possibility that men who had been in rebellion against

the United States within a year might sit in Congress.

Break between Congress and Johnson. The first open break between Johnson and Congress came in February, 1866, when the President vetoed a bill to establish a Freedmen's Bureau, for the protection of former slaves. Johnson's chief reason for vetoing the bill was that it had been passed by a Congress in which the Southern states were not represented. In July Congress passed a second bill to establish the Bureau; Johnson vetoed it, and Congress passed it over his veto. In the meantime the President had vetoed the Civil Rights Bill, which made the freedmen citizens, because according to his view it interfered with the rights of the states. Congress repassed the bill over his veto, and then proposed the Fourteenth Amendment, which contained the principles of the bill. Johnson disapproved of the amendment, but it was ratified by the required number of states and went into effect July 28, 1868.

Johnson's Views. In considering the President's veto and disapproval of these measures, it must be borne in mind that he had never pretended to be anything but a states'-rights Democrat, except in so far as he had held the preservation of the Union to be a fundamental necessity. According to his own views, he was on firm constitutional ground. The repassing of the bills over his veto led him to take part in the Congressional elections in the autumn of 1866, but in spite of his somewhat undignified efforts, the radical Republicans remained in control of Congress and at once put into effect their reconstruction policy. Johnson's policy, which was also Lincoln's, was based on the assumption that the Southern states had never been out of the Union, and that the Federal government must recognize the new state governments whenever these complied with the Constitution. Accordingly, punishment could be inflicted only upon individuals.

The Congressional Plan. The Congressional plan, on the contrary, was based on the theory that the Southern states were no longer part of the Union and were conquered territory. The chief features of the Congressional plan were to prevent the late Confederates from voting, and to give the negroes the right to vote. Johnson's plan, as stated above, was also Lincoln's plan, but even if Lincoln had lived, it is doubtful if he could have carried it through. Johnson lacked the tact to conciliate a stubborn Congress; and worse, he expressed the most uncomplimentary opinions about it. In return, Congress rejected Johnson's plan entirely and proceeded to work out its own plan. A bill was passed depriving the President of the power of proclaiming a general amnesty, and another bill took from him the command of the army, by providing that all

orders from the President must be transmitted to the army through the general, who could not be removed without the consent of the Senate. Then Congress passed the Tenure of Office Act, which took away the President's right to remove civil officers of the government. Johnson vetoed these bills, but they were passed over his veto. By these laws the independence of the President was practically destroyed. Congress divided the South into five military districts, and proceeded to maintain the "reconstructed" governments in power by military force.

Removal of Stanton and Impeachment. The climax in the quarrels between Congress and the President was still to come. The Cabinet, which had at first supported Johnson, later divided in its opinions. So outspoken was the opposition that Johnson finally suspended from office Edwin M. Stanton, Secretary of War, and appointed General Grant in his place. Congress refused to ratify the suspension; Stanton again assumed the duties of his office, and was again removed by the President. Stanton refused to yield, the Senate declared this removal illegal, and the House of Representatives, on February 28, 1868, passed a resolution impeaching the President. Of the eleven counts in the articles of impeachment, the most important were the first, which stated that the removal of Stanton was contrary to the Tenure of Office Act, and the eleventh, a general charge that the President had committed a series of misdemeanors in his attacks on Congress.

The trial began on March 5, 1868. After the trial began, Johnson made a series of violent speeches on a tour which is famous as "swinging around the circle," because he said in one speech that he had swung around the circle of offices from alderman to President. Many of the charges against the President were trivial and were supported by inconclusive evidence; the lawyers for the prosecution appealed chiefly to the violent political passions of the day. The first vote in the Senate, taken on May 16, was on the eleventh count; the result was thirty-five votes for conviction, nineteen for acquittal. A change of one vote would have given the prosecution the two-thirds majority necessary for conviction. Ten days later, a vote was taken on two other counts, with the same result. No ballot was ever taken on the remaining counts. By the margin of one vote, the President was saved from removal.

Other Events of the Administration. The struggle between Congress and the President and the disorders of reconstruction in the South were the outstanding features of Johnson's Presidency. The most important of the lesser events was the purchase of Alaska from Russia in 1867 for \$7,200,000. The purchase

OUTLINE AND QUESTIONS ON ANDREW JOHNSON

Outline

I. Early Years

- | | |
|---|---|
| <ul style="list-style-type: none"> (1) Birth and parentage (2) Boyhood <ul style="list-style-type: none"> (a) Lack of education (b) Apprenticeship (3) Removal to Tennessee (4) Marriage | <ul style="list-style-type: none"> (b) Attitude of Congress (c) Freedmen's Bureau Bill (d) The Civil Rights Bill (e) The Fourteenth Amendment (2) Quarrel between President and Congress <ul style="list-style-type: none"> (a) Tenure of Office Act (b) Command of army taken from President (c) Removal of Stanton |
|---|---|

II. Early Political Career

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| <ul style="list-style-type: none"> (1) The "workingmen's party" (2) As mayor (3) In the Tennessee legislature (4) In the House of Representatives (5) As governor of Tennessee (6) In the Senate (7) Attitude toward secession (8) Military governor of Tennessee (9) Elected Vice-President <ul style="list-style-type: none"> (a) Concession to War Democrats | <ul style="list-style-type: none"> (3) Impeachment <ul style="list-style-type: none"> (a) Charges (b) Results (4) Other events <ul style="list-style-type: none"> (a) Purchase of Alaska (b) Withdrawal of French army from Mexico (c) Atlantic Cable laid (d) Nebraska admitted to the Union (5) Election of 1868 <ul style="list-style-type: none"> (a) Candidates (b) Issues (c) Results |
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III. Administration

- | | |
|---|---|
| <ul style="list-style-type: none"> (1) Reconstruction problems <ul style="list-style-type: none"> (a) Change in President's views <ul style="list-style-type: none"> 1. Adoption of Lincoln's lenient policy 2. Proclamation of amnesty | <h4 style="text-align: center;">IV. Later Life</h4> <ul style="list-style-type: none"> (1) Election to Senate (2) Death and character |
|---|---|

Questions

How many Southern Congressmen took the same attitude that Johnson did at the outbreak of the War of Secession?

What might have been the results for the Presidential office if Johnson had not resisted the attacks of Congress?

Why was he suggested as candidate for President in 1860?

What was Johnson's attitude toward the Southern states after the war? How did it compare with Lincoln's?

What were Johnson's reasons for vetoing two important measures which Congress was determined to put through?

Why was Johnson's marriage of unusual significance?

What was the cause of his changed views as to the South?

What was his last important act as President?

In what way did his ancestry and his early life resemble those of Lincoln?

What was "Seward's Folly," and why was it so called?

Why was it easier to communicate with England at the close of this administration than at the beginning?

For what should Johnson be chiefly remembered?

What speech of his caused him to be mobbed, hooted, and hanged in effigy?

In what picturesque way did Johnson express his scorn for the lessening of Presidential powers attempted by Congress?

What steps are necessary to secure the impeachment of a President, and how did Johnson's impeachment and trial result?



Photo: U & U

GRAVE OF ANDREW JOHNSON

In the cemetery at Greeneville, Tenn. It is marked by a noble granite shaft, surmounted by a bronze eagle poised for flight.

was opposed by many leaders of public opinion, who referred to it as "Seward's folly," but the transfer was finally approved by the Senate. In the same year, Seward made vigorous protests to France against the presence of a French army in Mexico, with the result that the army was withdrawn and the empire of Maximilian fell. After two unsuccessful attempts, the Atlantic cable was successfully laid in 1865. Nebraska was admitted to the Union in 1867.

The last months of Johnson's term were uneventful. He was a candidate for the Democratic nomination for President, and on the first ballot he stood second on the list. The convention finally nominated Horatio Seymour, who was defeated by U. S. Grant, the Republican candidate. Johnson's last important official act was the proclamation, on Christmas Day, 1868, of complete pardon to all who had been directly or indirectly concerned in secession. After his return to Tennessee, he was not satisfied with retirement, and made several unsuccessful attempts to secure a seat in Congress before he was finally elected to the Senate. He took his seat in March, 1875, during a short special session. He died in four months, on July 31, as the result of a stroke of paralysis,

and was buried at Greeneville, Tenn., his old home.

E.D.F.

Eliza McCardle Johnson (1810-1876), wife of the seventeenth President, who, in spite of invalidism, influenced him during his Presidential career, and sustained her belief in his fairness throughout the political attacks made upon him.

When she married the young tailor, Andrew Johnson, Eliza McCardle was the most beautiful girl in all her mountain countryside, and barely seventeen years old. It was she who taught her husband to write, and by her inspiration and superior education held a constant incentive to progress before him. During his early public successes, she shrank from observation, insisting that she give her help in caring for their five children and conserving their slender personal fortune.

In spite of her ill health, the White House during the Johnson administration was a livelier place than

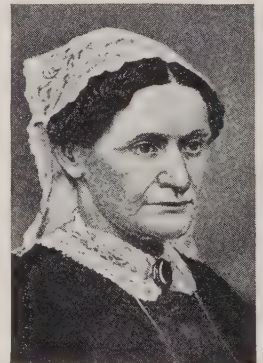


Photo: U & U

MRS. ELIZA M'CARDLE JOHNSON

it had been during the gloomy war days, for the White House family included two sons of the President (one a boy of fourteen); two daughters, Mrs. Stover and Mrs. Patterson; the latter's husband, Senator Patterson; and the President's five grandchildren. Mrs. Patterson acted as mistress of the mansion. Although she was constantly ill, Mrs. Johnson lived for six months after her husband's death, and died at her daughter's home in Tennessee.

Related Subjects. The reader who desires additional information regarding events connected with the life and times of this President are referred in these volumes to the following articles:

Cable, Submarine	Maximilian
Compromise of 1850	Mexico (History)
Impeachment	Reconstruction
Lincoln, Abraham	Tenure of Office Act

JOHNSON, EDWARD, an operatic tenor, born at Guelph, Ont. After studying at the University of Toronto, he began a musical career in New York, singing in a church choir, in concert, and in light opera. He then went to Florence, Italy, for study, and made his début at the Verdi Theater, Padua. Johnson sang for five seasons at the famous La Scala, in Milan, and in 1914 sang the tenor rôle in *Parsifal*, his performance being the first rendition of that part in Italian. On his return to the United States, in 1920, Johnson sang for two seasons with the Chicago Grand Opera (now the Civic Opera) Company. Since 1922 he has been a popular star of the Metropolitan organization, in New York. His voice is especially adapted to lyric rôles, but he has marked dramatic gifts.

JOHNSON, HIRAM WARREN (1866-), a statesman of the progressive type, United States Senator, and unsuccessful candidate for the Presidential nomination, was born in Sacramento and educated at the University of California. He was admitted to the bar at the age of twenty-one and was soon recognized as an able lawyer, but did not attract public attention until the prosecution of the graft cases in San Francisco in 1906 and 1907. Johnson was assistant prosecuting attorney for the state, and when Francis J. Heney, in charge of the prosecution, was shot, Johnson took charge of the cases and secured the conviction and imprisonment of the most notorious of the defendants. In 1910 he was nominated for governor by the progressive branch of the Republican party, and made an automobile tour of the state, in which he made

a special plea to the farmers. His slogan was "The Southern Pacific Railroad must be kicked out of state politics," and at the end of a hard campaign, he was elected. During his first term as governor, he disposed of many inefficient officers, established civil service for state employees, created a railroad commission, instituted the referendum and recall, and secured the passage of laws granting woman suffrage and state-wide primaries.

Governor Johnson took a prominent part in the National Republican Convention of 1912. He opposed the candidacy of President Taft, followed ex-President Roosevelt in forming the Progressive party, and became its candidate for Vice-President. In 1914 he was again nominated for governor and elected by a plurality of 188,500. In 1916 he was sent to the United States Senate, and was reelected in 1922 and 1928. In 1920 and 1924 he sought the Presidential nomination, but was defeated in the convention the first time, and in 1924 he withdrew his name after being defeated in the early primaries by President Coolidge.

JOHNSON, JACK. See PRIZE FIGHTING.

JOHNSON, LAKE. See SASKATCHEWAN (Rivers and Lakes).

JOHNSON, PAULINE. See CANADIAN LITERATURE (English Canada).

JOHNSON, RICHARD MENTOR (1780-1850), an American soldier and statesman, Vice-President of the United States during the administration of Martin Van Buren (which see). He was born in Kentucky and received his education at Transylvania University, beginning his political career, in 1805, with election to the Kentucky legislature on the Democratic ticket. He was a Representative in Congress from 1807 to 1819, and during this time became colonel of a regiment that fought in the War of 1812. Johnson distinguished himself in the Battle of the Thames, where, it is said, he shot the Indian chief, Tecumseh. In the Democratic convention that nominated Van Buren for the Presidency, Johnson was selected as candidate for the Vice-Presidency. When the electoral votes were counted, however, it was discovered that the choice of Vice-President was prevented by the action of the Virginia electors, who had voted for William Smith of Alabama. The election was accordingly thrown into the Senate, which gave Johnson a majority vote. In 1844 he was an unsuccessful candidate for the Democratic nomination for the Presidency.

JOHNSON, SAMUEL (1700-1784), an English writer of the eighteenth century, one of the most striking and original personages, not only of his own age, but of the whole period of English literature. He wrote no masterpiece, either in prose or in poetry, and his famous *Dictionary*, though of value as the first important attempt at an English lexicon, is now



Photo: Wide World

HIRAM W. JOHNSON

regarded as a literary curiosity. It was Johnson's astonishing personality, more than his literary achievements, that made him the dominant figure of his time and has kept his name alive.

Thanks to a remarkable biography, written by an obscure barrister named James Boswell (which see), the world has come to know the life and character of Johnson in every detail. In that famous *Life* is pictured a large, awkward man, vulgar in appearance and uncouth in manner, with his face scarred with the marks of disease, who tells his hostess to stop talking nonsense, who calls a distinguished guest a "vile Whig," who leans back at the table to "blow out his breath like a whale," and who abuses everybody that disagrees with him. Yet, to use the words of Carlyle, he was a "mass of genuine manhood, a man who would starve before he bartered away his independence, and who was loved and honored by all who knew him."

Johnson was the son of a poor bookseller of Lichfield, in Staffordshire. He was born with a tendency to scrofula, and when a child of three, was taken on a futile journey to London by his parents to be healed with the "royal touch" of Queen Anne. His constant reading of his father's books proved a more important education than his regular schooling. He entered Oxford in 1728, but his extreme poverty compelled him to leave the university after a little more than two years. In 1735 he married a woman old enough to be his mother, whom he loved devotedly, and with her dowry of £800 (about \$4,000), they started a private school in Lichfield.

This proved a failure, and Johnson journeyed to London to begin life as a writer. Years of poverty and discouragement followed, but he slowly won a name for himself, and when, in 1762, George III granted him a yearly pension of £300, or about \$1,500, life brightened for him. With Joshua Reynolds, a renowned artist, he founded the famous Literary Club, where he out-talked the greatest literary men and artists of the day. One who wishes to read these celebrated conversations will find them recorded in Boswell's *Life*.

His Writings. Johnson became a regular contributor to the *Gentleman's Magazine* in 1738, the year in which he published his first poem, *London*. The best of his poetic works, *The Vanity of Human Wishes*,

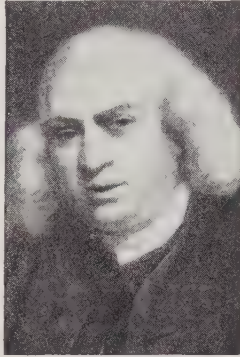


Photo: Brown Bros.

SAMUEL JOHNSON

appeared in 1749, and soon after, his tragedy, *Irene*, was produced at the Drury Lane Theater. The success of Addison's *Spectator* encouraged him to begin the *Rambler* (1750-1752) and the *Idler* (1758), but his heavy, ponderous style prevented his periodicals from becoming popular. Goldsmith said that Johnson would make "little fishes talk like whales."

Meantime, he had begun work on the *Dictionary of the English Language*, which, after eight years of toil, he issued in 1755. Humor and prejudice appear frequently in this remarkable work, as shown in his definition of oats—"a grain given in England to horses, and in Scotland to the people." His only novel, *Rasselas*, which was published in 1759, was written to provide money for his mother's funeral. In 1775 he wrote a description of a journey to Scotland and the Hebrides, made in company with Boswell; three years before his death, he completed his last literary undertaking, *Lives of the Poets*, the most readable of his works.

B. M. W.

JOHNSON CITY, TENN. See **TENNESSEE** (back of map).

JOHNSTON, jon' stun, ALBERT SIDNEY (1803-1862), a leading Confederate general in the American War of Secession. He was born in Washington, Ky., and was graduated from West Point in 1826. He became chief of staff to General Atkinson in the Black Hawk War, and in 1837 joined the Texans in their struggle for independence from Mexico, superseding General Houston as commander in chief of the Texan army. After the Mexican War, Johnston joined the United States army. In 1857 he commanded the expedition against the Mormons in Utah, winning the brevet of brigadier general for his skill and discretion. At the outbreak of the War of Secession, he united his fortunes with the Confederate states,

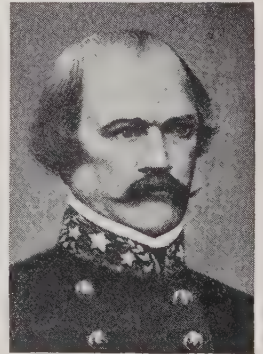


Photo: Brown Bros.

ALBERT SIDNEY JOHNSTON

and in 1861 the Confederate government made him commander of the military forces in Kentucky and Tennessee. At the Battle of Shiloh, on April 6-7, 1862, when Grant halted to rest his men and wait for General Buell to join him, Johnston, with a greater force, fell upon the Federals. Grant was driven back, but in a moment of apparent victory, Johnston was struck by a rifle ball and soon died. He has been ranked with the ablest of the Confederate commanders. See **WAR OF SECESSION**.

JOHNSTON, JOSEPH EGGLESTON (1807-1891), an American soldier and Confederate general, born in Cherry Grove, Va. His father was a jurist, and his mother was a niece of Patrick Henry. In 1829 he was graduated at

West Point, Robert E. Lee being a classmate. During the Seminole War, Johnston was aid to General Winfield Scott and earned the brevet of captain, and in the Mexican War he was twice wounded at the Battle of Cerro Gordo. In 1855 he became colonel of the First United States Cavalry, and in 1860 was quartermaster general of the army.

At the outbreak of the War of Secession, Johnston resigned from the army when Virginia seceded, was soon commissioned a brigadier general by the Confederate President, and almost immediately thereafter was raised to the rank of major general. He



JOSEPH E. JOHNSTON

was assigned to a command in the Army of the Shenandoah and took an active part in the first Battle of Bull Run in July, 1861, coming to Beauregard's aid with his army. At the Battle of Fair Oaks on May 31, 1862, he was wounded. He opposed General Sherman in the Atlanta campaign and won the Battle of Kenesaw Mountain, but his policy of being too cautious was criticized, and in July, 1864, he was superseded by the more venturesome Hood. Early in 1865, Johnston commanded the Carolina Confederate forces, and on April 26 surrendered to Sherman, the terms being similar to those accepted by Lee. In 1887 he was appointed commissioner of railroads by President Cleveland.

JOHNSTON, MARY (1870-), an American novelist, best known as the author of romances based on early American history.

She was born at Buchanan, Va., and was privately educated. When she was eighteen years old, she visited Europe with her father, and had the notes on this trip published in a Virginia newspaper. Her first novel, *Prisoners of Hope*, a romance of Virginia, was published in 1898, and Miss Johnston immediately found a place among the literary celebrities of the country. *To Have and to Hold*, a colonial story of Virginia, is her most successful novel. She portrays her characters vividly, and the



Photo: Brown Bros.

MARY JOHNSTON

spirit of the times with which the story deals is well sustained.

Her Other Books. These include *Audrey*, *The Long Roll*, *Cease Firing*, *The Witch*, *Sweet Rocket*, *Silver Cross*, *Croatan*, *The Slave Ship*, *The Great Valley*, and *The Exile*.

JOHNSTOWN, N. Y. See NEW YORK (back of map).

JOHNSTOWN, PA., a manufacturing city in Cambria County, in the southwestern part of the state, seventy-five miles east and south of Pittsburgh. It is situated at an altitude of 1,165 feet, and lies in a deep, level valley in the western hills of the Allegheny Mountains, at the junction of Little Conemaugh and Stoney Creek, which continue as the Conemaugh River. Population, 1928, 73,700 (Federal estimate).

In Grand View Cemetery are buried 800 unidentified victims of a great flood which occurred here on May 31, 1889. It was caused by the bursting of the retaining dam of the South Fork Reservoir, a body of water twelve miles east of the city. This reservoir, swollen by heavy rains, released an enormous body of water which in a short time flooded the valley, practically destroying the city. More than 2,200 lives were lost, and the property destroyed was valued at \$10,000,000. Every part of the United States shared in the \$3,000,000 in money and supplies sent to relieve suffering and to rebuild the city.

Johnstown was founded in 1800 by Joseph Johns, a Swiss immigrant, and became a city in 1889. It has the commission form of government.

Transportation. The city is served by the Pennsylvania and the Baltimore & Ohio railroads, and by interurban and motorbus lines.

Industry. Johnstown is the center of a rich bituminous coal region; in Cambria County there are more than 200 mines. There are about 140 industrial plants. Two steel companies make a great variety of steel goods, ranging from wire brads to steel freight cars. Among the many enterprises are extensive manufactories of radiators, stoves, fire-clay products, furniture, paints, silks, and foundry products.

Institutions. The Junior College branch of the University of Pittsburgh is located here. Johnstown has 222 acres of public parks, twenty-one supervised playgrounds, and a public stadium seating 17,000.

JOHN THE ALMONER, *al' mun ur*. See CHRYSOSTOM, JOHN.

JOHN THE APOSTLE. See APOSTLES; DONATELLO, illustration.

JOHN THE BAPTIST (about 5 B.C.—A.D. 28), the great prophet and immediate forerunner of Christ, who in two years of public ministry not only prepared the people for Christ's appearance, but also pointed Him out to them. He was born in a small town, probably Hebron, in the hill country of Judea, just six months before the birth of Christ; the mothers of the two were cousins. After spending most of his

life in seclusion near his home, he appeared as a preacher in the wilderness along the banks of the Jordan, in A.D. 26. He urged people to repent immediately from their sins, baptizing many who accepted his teaching, from which he received the name *John the Baptist*. Near the close of John's ministry, Christ came to him to be baptized, and John, upon recognizing Him as the Messiah, proclaimed the fact to the people. John's public rebuke of Herod, the tetrarch, because of the latter's marriage with Herodias, his brother Philip's wife, led to the imprisonment of the prophet. Later, during a birthday feast, Herodias, using her daughter Salome as an instrument, trapped the drunken Herod into ordering John's death by beheading (see *Mark VI, 17-29*). See *HEROD* (Herod Antipas).

JOHORE, *jo hore'*, a small state 9,000 square miles in area (estimated), in the southern part of the Malay Peninsula. In foreign affairs it is under the control of Great Britain, but is independent in all local matters, because of the wise management of the native sultan. Of the 290,000 (estimated) inhabitants, there are a great many more Chinese than Malays. Johore is only 100 miles north of the equator, but the climate, moderated by the waters of the China Sea, is pleasant and healthful. The surface of the country is broken by a few hills, the highest, Mount Ophir, being 4,186 feet above the sea. The land is densely wooded and tropical fruits grow plentifully. Johore Bahru, the capital, is a city of about 20,000 inhabitants, and is sometimes called the "Monte Carlo of Asia." It is a popular resort for the people of Singapore, fifteen miles farther south, where the climate is much warmer. Johore has one railroad, connecting with a main line about 120 miles farther north. The exports, rubber, coffee, black pepper, gambier, gutta-percha, and sago, yield the state a large revenue.

JOINT, in geology, one of the even cracks that divide most large masses of rock into somewhat regular blocks. Joints are of two general sorts—*torsion* joints and *shrinkage* joints—although a few are formed in other ways. Torsion joints are produced in the warping and folding of rocks under great stress. They cut cleanly through rocks of all kinds, regardless of texture or coarseness of grain; in conglomerates they sever hard pebbles imbedded in a relatively soft matrix. Most torsion joints are slightly but noticeably curved, and they are generally developed in several sets, intersecting at various angles. The joints in each set are nearly parallel, and the whole system divides the rock into variously sized blocks, many of which are so regular as to seem artificial. Shrinkage joints are sometimes formed in fine-grained sedimentary rocks during the drying and hardening of the sedi-

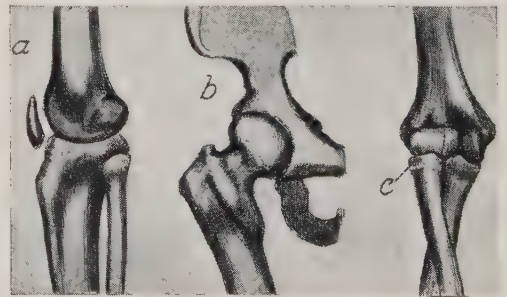
ment, but such joints generally do not extend outside the layer in which they are developed. Shrinkage joints are also formed in some igneous rocks, especially lava sheets and trap dikes, during the cooling and solidification of the molten rock. Where well developed, they divide the rock into fairly regular prismatic columns, with four to seven sides. Some formations of the sort are conspicuous scenic features, notably the Palisades of the Hudson, the Devil's Tower in Wyoming, and the Giants' Causeway on the northern coast of Ireland.

Some very large masses of rock, especially of granite, are almost wholly free from joints. Consequently, such masses weather chiefly by surface scaling (called *exfoliation*), and so develop a domelike form, characteristically displayed in the huge domes of the Yosemite Valley region and in Stone Mountain, near Atlanta, Ga.

Joints affect rock weathering by dividing the rock mass into smaller units and thus increasing the surface exposed to weathering, and by affording passage for ground water. They may affect the situation and flow of springs. They are sometimes helpful in quarrying, tunneling, etc., by facilitating the removal of large blocks, but at other times they are detrimental because they weaken the rocks or admit ground water to the excavation. L.LaF.

JOINTS, in anatomy, are formed by the meeting of two bones, and are chiefly for the purpose of giving the body flexibility and freedom of movement. In the countless acts that one performs every day, the joints have an indispensable part. In regard to their structure, joints are said to be *immovable* and *movable*.

Immovable Joints. These are placed where the bones are almost directly in contact with each other, separated only by a thin layer of



JOINTS

(a) Hinge; (b) ball and socket; (c) pivot.

connective tissue. Examples are the joints connecting the bones of the skull. Ordinarily, these joints are stationary, but in case of accident they may move enough to prevent the breaking of a bone. The cranium joints there-

fore help protect the brain, one of the most delicate organs of the body.

Movable Joints. The movable joints are found for the most part in the limbs, and are divided into three classes:

Hinge joints are those which permit a forward-and-backward motion in one plane, like the motion of a door on its hinges. The joints at the elbow and knee and the last two joints of the fingers are typical examples. *Pivot joints* give the movement of rotation, such as the motion of the head in turning from side to side. The joints which allow the greatest freedom of movement are the *ball-and-socket joints*. Important examples are those at the hip and the shoulder. In each case there is an enlarged and rounding end of a long bone (ball) fitting into a hollow of another bone (socket). The arms have a greater range of motion than the legs because the shoulder socket is more shallow than the hip socket, but the shoulder is more easily dislocated, that is, "put out of joint."

Protection of Joints. Movable joints are safeguarded in several ways. Wherever two bones glide over one another there is a layer of elastic cartilage, or gristle, on the end of each bone. Ease of movement is secured by the smoothness of the cartilage, and its elasticity serves to break the force of sudden jars. All movable joints are supplied with a lubricating substance called *synovial fluid*, which keeps the cartilages smooth and prevents the bones from feeling the wearing effects of constant movement. Bones are held in place at the joints by strong ligaments, which are fastened to the bones above and below the joint. At the hip there is a collar-like set of ligaments which form a *capsule* about the joint.

Joint Ailments. Joints are subject to sprains and dislocations. A sprain (which see) occurs when the ligaments about a joint are torn or badly stretched. Serious sprains are extremely painful, and if neglected may result in stiffening of the joints. Dislocated joints should have the attention of a physician, that the bones may quickly be put back in place.

The painful disease popularly known as rheumatism often settles in the joints, and the chronic form of this ailment usually cripples the patient. Gout is also a painful disease of certain joints.

K.A.E.

Related Subjects. Collateral information about joints will be found under the following titles:

Bone	Gout	Rheumatism
Cartilage	Ligament	Sprain

JOINT-STOCK COMPANY. In Great Britain, Canada, and the other British dominions, this term corresponds to *corporation* in the United States. A Canadian company may be chartered either by the Dominion or by a provincial government. If the liability

of individual members is limited to the amount of their investments, the word *Limited* (*Ltd.*) is a part of the company's name, and must be used in all documents and advertisements. In the United States the term is used to refer to unincorporated companies, held to be partnerships. See CORPORATION. F.H.E.

JOINT-TENANCY, or "tenancy not in common," is a legal form of conveyance in some states. The ownership of real estate "in common" between husband and wife implies the necessity of probate proceedings at the death of either party. Joint-tenancy does away with this step, and property so held automatically becomes the property of the survivor, without probate or other court proceedings. The term *joint-tenancy* must be stated in the deed of conveyance. Joint-tenancy has also been extended to cover the interests of two or more parties in regard to a safety-deposit box, although, should the death of one of the parties be known to the company renting the box, the survivor would not be permitted to have access to it until the court announced the legal right of said survivor to entry. Where one of the tenants conveys his part, the joint tenancy is destroyed and a tenancy in common results; the right of survivorship is also destroyed.

JOINT WORM. See WHEAT (Enemies).

JOISTS. See CARPENTRY (The Frame).

JOKAI, *yo' kah e*, MAURUS (1825-1904), a famous Hungarian novelist whose works, which include almost 300 volumes, present a splendid panorama of the political and social life of his country during the nineteenth century. His writings embrace novels, romances, dramas, humorous essays, and poems. He gained fame, too, as the editor of a revolutionary weekly, a political daily, and a humorous weekly. He was a prominent figure in the Hungarian revolution of 1848, and the entire revolutionary period, as well as his own imprisonment and escape, furnished the settings and plots for many of his best-known novels. His skill as a narrator is enhanced by a vivid imagination, a great sense of humor, and an intimate knowledge of Hungarian life.

Jokai's Works. The leading novels and dramas by this writer are *The Hungarian Nabob*, *The New Landlord*, *Black Diamonds*, *The Modern Midas*, *The Comedians of Life*, and *God is One*. He also wrote a *History of Hungary* which is held in high repute, and the dramas *King Koloman* and *The Martyrs of Szigetwar*.

JOLIET, *jo' li et*, ILL. See ILLINOIS (back of map).

JOLIET, *zho lya'*, LOUIS (1645-1700), a Canadian explorer who gave the world its first definite knowledge of the Mississippi River. He was educated for the priesthood in the Jesuit College at Quebec, his native city. Always fond of adventure, early in life he made

several expeditions to the head of the Great Lakes. In 1763 Joliet and Father Jacques Marquette, with five companions, set out to trace the course of the Mississippi River, by order of Frontenac, governor of Canada. In two birchbark canoes, the party ascended the Fox River, crossed the portage to the Wisconsin,



Photo: Brown Bros.

LOUIS JOLIET

sin, sailed down that stream, and entered the Mississippi, following its windings southward to a point not far from the mouth of the Arkansas. Satisfied that the Mississippi emptied into the Gulf of Mexico, and not into the Pacific Ocean, as had been generally believed, they returned to Quebec by way of the Illinois River and Lake Michigan. Although Joliet lost all his charts during this expedition, because his canoe overturned in the rapids of the Saint Lawrence, he was able from memory to draw a map of the discoveries he had made. He was presented with the island of Anticosti, where he built a fort. In 1697 he was given sovereign rights of Joliet, south of Quebec, which his descendants still possess. See MARQUETTE, JACQUES.

JOLSON, *jole' son*, ALBERT, or AL (1886-), the professional name of a popular singing comedian whose real name is ASA YOELSON. He was born in Washington, D. C., of Jewish parents, and began his theatrical career at the age of thirteen, when he took part in a mob scene at Herald Square Theater, New York, in *The Children of the Ghetto*. Thereafter, for some time, he traveled with circuses and Dockstader's Minstrels, and toured in vaudeville. In 1911, in *La Belle Paree*, a musical show held at the Winter Garden, New York, Jolson began a series of characterizations that made him eventually one of the highest-salaried comedians on the American stage. In *The Honey-moon Express*, *Robinson Crusoe, Jr.*, *Sinbad*,

and *Big Boy*, he was a popular favorite for many seasons. In 1928 Jolson's *Singing Fool*, a "sound" picture, was one of the outstanding successes of the moving-picture world. It was followed by others of like character. He specializes in black-face parts, and has a genius for combining humor and pathos that makes him irresistible. His huge income is augmented by phonograph royalties.

JONAH, a Hebrew prophet who figures in one of the best-known of Old Testament narratives. According to the story as given in the book of *Jonah*, he was commanded by God to go to the Assyrian city of Nineveh, to warn the people there that they were doomed to punishment because of their sins. Disobeying the Divine will, he went to Joppa and boarded a ship bound for Tarshish. During the voyage, a great storm lashed the sea into mighty waves, and the frightened sailors, thinking that this upheaval was due to some evil person on board, cast lots to see who was the cause of their peril.



Photo: O R O C

THE SITE OF JONAH'S TOMB

On the spot which is reputed to hold Jonah's tomb there is now a Moslem mosque. It is on one of the mounds of Nineveh, near Mosul, Iraq.

The lot fell to Jonah, who was cast into the raging sea. As soon as this was done, the storm ceased, and as the disobedient prophet sank into the waves, so the record says, he was swallowed by a great fish which God had sent for his deliverance.

At the end of three days and nights, during which the repentant Jonah lay within the fish

praying to God to save him, the prophet was cast forth upon dry land. When God a second time directed him to go to Nineveh, he obeyed, and so earnestly did he preach to the people that they repented. Jehovah therefore forgave them, and so Jonah's prophecy, that in forty days their city would be destroyed, was not fulfilled.

Jonah, instead of being pleased, was greatly disappointed, for he thought the people would consider him a false prophet. Accordingly, he left the city in a state of utter dejection, and it was only after much suffering of mind and body that he came to see the beauty of God's mercy to a misguided people. The historical accuracy of the book of *Jonah* has long been a subject of controversy, but modern critics usually regard the story as an allegory or parable.

A Modern Phrase. To say of a person that "he is a Jonah" is to imply that association with him leads to misfortune. The origin of the idea is seen in the narrative related above.

JONATHAN, the friend of David. See **DAVID**; **SAUL**.

JONATHAN, BROTHER. See **BROTHER JONATHAN**.

JONES, HENRY ARTHUR (1851-1929), an English playwright and essayist. He was born, a farmer's son, at Grandborough, Buckinghamshire, and was forced to leave school when barely thirteen years old. By his own efforts he obtained an education, and in 1879, when only twenty-eight, he attracted the attention of London with his first play, *The Clerical Error*. He had a gift for writing social dramas, usually comedies, and his plays move by bright, clever dialogue. His works have been remarkably popular both in England and in America, and several of them have been translated and played on the Continent.

Principal Works. Some of the best-known plays are *Saints and Sinners*, *The Liars*, *Mrs. Dane's Defense*, *Whitewashing Julia*, *The Hypocrites*, *Mary Goes First*, and *The Lie* (played in America in 1914 by Margaret Illington). He also published a collection of essays and lectures entitled *The Renaissance of the English Drama; Patriotism and Popular Education*; and *My Dear Wells*.

JONES, JOHN PAUL (1747-1792), a dauntless sea rover, of Scottish descent, who offered his services to the United States in the Revolutionary War. He was appointed commander of the flagship *Alfred* in 1775, was the first to raise the Stars and Stripes on a United States ship of war, and in 1777, when he sailed to Europe on the *Ranger*, he received the first salute ever given by a man-of-war to the newly adopted American flag.

He was born in Kirkcudbrightshire, Scotland. His name originally was JOHN PAUL, but out of gratitude to Willie Jones of North

Carolina, for friendship and support, he assumed the latter's name. When he invaded British waters in 1777, in command of the *Ranger*, he took advantage of his familiarity with the scenes of his boyhood to make a hostile cruise along the shore of the Solway Firth, and landed and attempted to burn Whitehaven.



Photo: U & U

JOHN PAUL JONES

In 1779, as commander of the *Bon Homme Richard*, Jones captured the British sloop of war *Serapis*, after one of the most desperate and spectacular of the world's sea fights. The *Bon Homme Richard* and *Serapis* drew so close to each other that their rigging became entangled, and Jones attempted to board the British ship. After a short fight, Jones was repulsed and the vessels separated, but remained so close together that the muzzles of their guns touched. The British commander, sensing victory, called upon Jones to surrender, but the latter replied, "I have not yet begun to fight." Both vessels caught fire, and after a terrible hand-to-hand encounter, the tall mast of the *Serapis* fell, and Pearson, commander of the vessel, surrendered. For this victory, Congress gave Jones the nation's thanks, a gold medal, and a commission as commander of the *America*, a ship of the line which was presented soon afterward to France. The French king made Jones a knight of the Order of Merit.

Captain Jones (for he never received a higher title from the United States) was destined for other command, but the peace of 1782 put an end to that opportunity. In 1787 he entered the service of Russia as rear admiral, was made vice admiral, and was knighted after a

victory over the Turks. He resigned from the Russian navy and was appointed consul of the United States at Algiers in 1792, but died in Paris on July 18 of that year, before the commission reached him. In July, 1905, his burial place was discovered beneath a four-story building in that city, and by consent of France, his body was brought to the United States by a squadron of battleships and interred at Annapolis. A.B.H.

In the Hall of Fame. In 1905 the name of Jones was proposed for the Hall of Fame, but was rejected on the ground that he was a "soldier of fortune," having served Russia after his brilliant Revolutionary career. In 1925, however, on a second proposal of his name, he was selected as one of America's 150 immortals. See HALL OF FAME.

JONES ACT, legislation affecting the Philippine Islands. See PHILIPPINE ISLANDS (Government).

JONESBORO, ARK. See ARKANSAS (back of map).

JONES LAW, an act passed by the Congress of the United States in March, 1929, to increase the penalties for violation of prohibition laws. Prior to the passage of this act, the penalties for the illegal sale or manufacture of liquor were: for a first offense, a fine up to \$1,000, or imprisonment up to six months; for subsequent offenses, fines from \$200 to \$2,000, and one month's imprisonment. The Jones Law provides fines up to \$10,000 for first and subsequent offenses, or imprisonment up to five years, or both. It has the effect of raising all violations of prohibition laws to the status of felonies. Any offense against the United States which carries a maximum penalty of less than one year in jail is a misdemeanor; of more than one year, a felony. The act received its name from its author, Senator Wesley L. Jones of Washington. See PROHIBITION; VOLSTEAD ACT.

JONGLEURS, *zhon' glurz*. See MINSTREL.

JONQUIL, *jon' kwil*, the name applied to certain sweet-scented, yellow species of narcissus, native to Southern Europe and Northern Africa, but cultivated in other countries. From bulbs planted in autumn, four inches deep in well-drained, rather rich soil, foot-high flower stalks appear, which in April bear clusters of three to six dainty flowers. Each consists of an inch-long yellow tube, surrounded by yellow petals. The flowers are much used by manufacturers of perfumes. The flower stem is leafless, but glossy, dark-green leaves, very narrow and rushlike, spring from the ground and surround each stalk of flowers. The name jonquil is from the Latin *juncus*, meaning *rush*, and was suggested by the shape of the leaves. Jonquils are readily grown in conservatories for January blooming. See DAFFODIL; NARCISSUS.

B.M.D.

Scientific Names. Jonquils belong to the family *Amaryllidaceae*. The best-known species include the

common jonquil, *Narcissus jonquilla*; and the sweet-scented jonquil, *N. odoratus*.



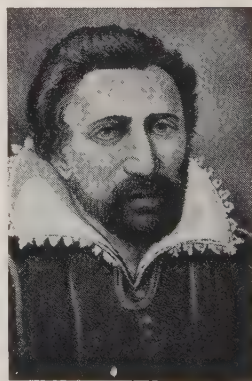
Photo: Visual Education Service

THE JONQUIL

JONSON, BEN (about 1573-1637), an English dramatist and lyric poet, the friend of Shakespeare and one of the commanding figures among the writers of the Elizabethan Age. The world's estimate of him is chiseled in four words on his tomb in Westminster Abbey: "O rare Ben Jonson."

Of all the Elizabethan dramatists, he alone adhered to the standards of the Greek and Roman classics, and he fought unflinchingly though unsuccessfully against the romantic tendency of the period. His plays are historically accurate, even in the smallest details, and are logically constructed, and his characters are presented with extraordinary realism.

Jonson was born at Westminster, was educated at Westminster Grammar School, and, according to an unsupported tradition, at



"O RARE BEN JONSON"

A modern critic has advanced the suggestion that "O Rare" is an engraver's mistake for *Orare*, the Latin for *pray for*. This is a point that can never be decided.

Cambridge University. After leaving school he was set to learning the brickmaker's trade, but, tiring of this occupation, he ran away and joined the English army which was fighting the Spaniards in the Netherlands. There he distinguished himself by killing a soldier in a duel, both armies watching the combat from the lines. On his return to England, he began a theatrical career as an actor and reviser of old plays, like his celebrated contemporary, Shakespeare.

Jonson's first important play, *Every Man in His Humour*, written to ridicule the city life of his day, was presented in 1598, one of the parts being played by Shakespeare. Numerous other dramatic works followed, and his masques (dramatic spectacles in which the characters are mythological personages) so pleased King James I that he appointed the author poet laureate in 1619. His life on the whole, however, was stormy, for he quarreled with nearly all his literary friends, and he was nearly hanged at one time, for killing an actor in a duel. There is a tradition that Shakespeare died from the effects of a fever contracted while he was entertaining Jonson and a fellow-poet, Michael Drayton, at the Stratford tavern. Jonson himself outlived his famous friend twenty-one years, and though he died in poverty, he was buried with great honor in Westminster Abbey.

Representative Works. Modern readers remember Jonson best for his poems and songs, such as the one beginning:

Drink to me only with thine eyes,
And I will pledge with mine;
Or leave a kiss but in the cup
And I'll not look for wine.
The thirst that from the soul doth rise
Doth ask a drink divine,
But might I of Jove's nectar sup,
I would not change for thine.

Jonson's work as a dramatist is best represented by three satires, *Every Man in His Humour*, *Cynthia's Revels*, and *The Poetaster*; the comedies *Volpone*, or *the Fox*, *The Alchemist*, and *Epicoene, or the Silent Woman*; and the tragedies *Sejanus* and *Catiline*. *The Sad Shepherd*, a pastoral poem of great beauty, was left unfinished at his death.

JOPLIN, Mo. See MISSOURI (back of map).

JOPPA. See PALESTINE (The Cities: Jaffa).

JORDAN, DAVID STARR (1851-), American educator, naturalist, and advocate of world peace, was born at Gainesville, N. Y. He entered Cornell University in 1868, where he was graduated in 1872. He taught biology successively at Lombard University, the Indianapolis High School, and Butler University, and in 1879 became professor of zoölogy at Indiana University, of which he was made president in 1885. In 1891 he resigned to accept the presidency of the newly established

Leland Stanford Jr. University at Palo Alto, Calif. (now Stanford University), and under his administration it attained high rank. He resigned the active presidency in 1913, and was made chancellor, that he might devote time to teaching the world the horrors and economic waste of war.

From 1910 he was chief director of the World Peace Foundation, and in furtherance of its plans, was in Europe at the time of the outbreak of the World War, in 1914. In 1917 he exerted himself unsuccessfully to prevent a declaration of war on the part of the United States.

Meanwhile, from 1877 to 1891 and from 1894 to 1909, Dr. Jordan had been assistant to the United States Fish Commission, and had served as United States commissioner in charge of the fur-seal and salmon investigations in 1901 and 1903. He became one of the nation's greatest authorities on fishes.

What He Wrote. His works, which are numerous and of great importance, include *A Manual of Vertebrate Animals of the Northern United States*, *Fishes of North and Middle America*, *Footnotes to Evolution*, *The Story of Mithra*, *The Blood of the Nation*, *Food and Game Fishes of North America*, *Fishes*, *The Stability of Truth*, *World's Peace and the College Man*, *War and the Breed*, *Ways to Lasting Peace*, *The Genera of Fishes*, *The Days of a Man*, *Classification of Fishes*, and *The Higher Foolishness*.

JORDAN RIVER, an historic stream in Palestine, associated with some of the most vital events of the past. To the Church it will always remain of peculiar interest, because



Photo: Brown Bros.

DAVID STARR JORDAN



COURSE OF THE JORDAN



Photo: O R O C

SOURCE OF THE JORDAN

The location is at Banais, in Syria, directly south of Mount Hermon, whence come the waters which form the source of the river. The illustration shows about one-third of the area where the water springs from the ground. In ancient times, it issued directly from a cave, but that was blocked centuries ago by a landslide.

along its course and in its valley the Christian religion struggled through its foundation years. Rising in the northern mountain springs of Palestine, it makes a sharp descent and flows below sea level for most of its 200 miles. It winds in and out through a deep valley, called the Ghor, emptying into the Dead Sea, whose surface is about 1,300 feet below that of the Mediterranean.

In the short distance of ten miles from Lake Merom to the Lake of Tiberias, better known as the Sea of Galilee, the river falls 689 feet, and so many rapids and whirlpools are formed that navigation is impossible; along the rest of its zigzag journey, the water is not more than two or three feet deep, except at the flood season in March. Then the melting snows from Mount Hermon often flood the little river valley, which is from one-half to two miles wide and lies in the center of the larger valley.

The Jordan was the river over which Biblical record declares that Joshua led the Children of Israel into the Promised Land (see *Joshua* III, 1-17), and in its waters Christ was baptized by John the Baptist. To-day, thousands of pilgrims journey every year from their own countries to bathe in its waters. The ancient custom of preserving the bathing-garments to be buried in is still followed by many people. See PALESTINE.

JORULLO, MOUNT. See MEXICO (Its Surface).

JOSEPH, the husband of Mary, the mother of Jesus, was a carpenter in Nazareth. Being a descendant of David, he had to go to Bethlehem for enrollment, according to the decree of the Emperor Augustus; hence he was there with his wife when Jesus was born. Warned by an angel in a dream that Herod wished to murder the babe, Joseph took his small family to Egypt, but they returned to Nazareth soon after they heard of Herod's death. Once a year he went to Jerusalem with Mary to attend the Feast of the Passover, and when Jesus was twelve years old, they took him with them. Little is known concerning Joseph from this time on, although he probably lived until the beginning of Jesus' public ministry. At the time of the Crucifixion, Jesus asked John to care for his mother, so Joseph must then have been dead.

Related Subjects. The reader is referred in these volumes to the following articles:

David	Mary (the Virgin)
Herod (the Great)	Passover

JOSEPH (1700-1590 B.C., Biblical chronology), the Hebrew lad who was sold into Egypt by his brethren and became the great prime minister of Pharaoh. The story of Joseph is one of the most interesting story-dramas of all time, and is powerfully told in



From the painting by Schopin

JOSEPH SOLD BY HIS BROTHERS

the book of *Genesis*. He was the eleventh of the twelve sons of Jacob, who was ninety years of age when the boy Joseph, destined for great things, was born. To the aged father, this son was the dearest of all his children, dearer even than the youngest, Benjamin.

As the years passed by, Joseph made a practice of going with his elder brothers into the fields to help them tend the flocks. One day, when he was seventeen years old, he appeared among them in a coat of many colors, the gift of his father. Now in those days such a garment was a mark of distinction, and the hearts of the older brothers were filled with bitterness and jealousy that so young a lad should be thus honored in preference to one of them.

Then something happened which turned their jealousy into hatred. Joseph told them about two wonderful dreams of his—prophetic visions of his future power as a great ruler, though, of course, he was not conscious of their significance. He said he dreamed that he was binding wheat in a field with his brothers, when suddenly his sheaf stood upright, while the sheaves of his brothers gathered round and bowed down to it. In the second dream, it appeared to him as if the sun, moon, and eleven stars bowed down to him.

One day, while the brothers were watching their flocks in the pastures of Dothan, they saw Joseph in the distance coming toward them, and one of them said, "Behold, this

dreamer cometh. Let us slay him." But Reuben, who was not so cruel, urged them to put him in a deep pit without harming him. To this suggestion they finally agreed, after taking his beautiful coat from him. Soon after, as they were eating, a band of Ishmaelites suddenly appeared, with their camels laden with spices and precious things which they were carrying from Gilead down into Egypt. Upon Judah's suggestion, the brothers, during Reuben's absence, drew Joseph out of the pit and sold him to the Ishmaelites for twenty pieces of silver. The brothers killed a kid, rent the coat, stained it with the kid's blood, and took it to Jacob, telling him that a wild beast had destroyed Joseph. The old man said that he should go down to his grave weeping for his son.

A Slave in Egypt. The band of Ishmaelites carried Joseph to Egypt, where Potiphar, the captain of Pharaoh's guard, bought him. Here he served his master so faithfully that he was made overseer of the household; but he offended Potiphar's sensuous wife, and she had him imprisoned upon false accusations. He soon obtained the confidence of the jailer, who placed him in charge of all the prisoners.

It happened that Pharaoh's chief butler and baker offended their lord, so they also were cast into prison. One night they both had strange dreams, which Joseph interpreted correctly for them, for he told the butler that in three days he would be freed, while the baker was to be hanged at the same time. Before

the butler left the prison, Joseph asked him to try to obtain his pardon, but he forgot him completely until two years later, when Pharaoh had two very strange dreams which no one could interpret. Then Pharaoh, upon being told about the dreams in prison, sent for Joseph to come to interpret his dreams. The first was that seven fat kine—that is, cattle—were grazing in a field near the river when seven lean kine came and ate them up; the second was of seven good ears of corn which sprang up, but were devoured by seven thin ones. Joseph said that both these dreams meant that there would be seven years of plenty in Egypt followed by seven years of famine, and he advised Pharaoh to choose some wise man to gather in the extra food from the land of Egypt during the time of plenty, so that the people could be fed when the famine came.

The Prime Minister. Pharaoh was so pleased with Joseph's sense and wisdom that he chose him as the man to oversee the storing of corn and grain, making him overseer over all of Egypt. For seven years there were abundant crops in all lands, and Joseph carefully watched over Egypt, so that when the famine suddenly spread throughout the known world, his country was not in want.

Up in Canaan no grain had been saved, so Jacob and his family soon were much in need of food, and the ten oldest sons were sent down into Egypt to buy corn. Of course they did not recognize their brother Joseph when they were brought before him, for it was twenty years since they had sold him into slavery. Joseph, however, knew them immediately, for some of the older ones had changed but little. Pretending to think that they were spies, he asked them about their home, and when they said that they had another brother, Benjamin, at home, he told them to go and get him, to prove that what they said was true. As they left, he ordered their bags to be filled with corn, and the money which they had paid hidden in the bags, while he kept one brother, Simeon, as hostage until they returned.

When the old father Jacob heard the things his sons told him, he refused at first to let Benjamin go back with them, but after all the corn had been eaten, he was obliged to let the brothers take the boy with them on their return for more food. As Joseph saw Benjamin, he longed to take him in his arms and weep for joy, for Benjamin was his own brother, the son of Rachel, Joseph's mother, while the others were all half-brothers. But instead, he did not tell any of them who he was until he had tested their character. When he found how thoughtful they were of their father, he sent the servants from the room and told all about himself.

The brothers were ashamed to look at him, but Joseph told them that he forgave them

for their wickedness. After this happy reunion, he told them to go and bring their father, with all their families, down into Egypt, where they could have plenty of food for themselves as well as for their cattle. When Pharaoh heard the good news, he gave them wagons and provisions sufficient to last until they could return to Egypt.

Settling His Family in Egypt. At first Jacob could not believe that his son Joseph still lived and was a great ruler in Egypt, but when he saw the wagons sent to carry all his family into the new land, he said, "It is enough, Joseph my son is yet alive; I will go and see him before I die." So all of his children and grandchildren and even great-grandchildren loaded their things into the wagons and journeyed to the land of Goshen, where Joseph met them.

When Joseph told Pharaoh that his people had come, the king asked their occupation, and when he found that they were shepherds, he told them to settle where they were, for it was a rich country. So Jacob blessed Pharaoh for his kindness and lived for seventeen years in the new home. Joseph lived to be 110 years old.

Joseph had two sons, Ephraim and Manasseh, who became the fathers of the two tribes of Israelites that bore their names. This story tells us how the Israelites were led into Egypt, where, after Joseph's death, later Pharaohs made them slaves.

Related Subjects. The reader is directed to the remarkable story of Joseph, in the book of *Genesis*, for an example of forceful writing not excelled in modern times, and to the following articles in these volumes:

Benjamin Jacob Pharaoh

JOSEPHINE, MARIE ROSE (1763-1814), wife of Napoleon Bonaparte, and therefore empress of the French, was one of the most pathetic figures in modern history. When she was seventeen years old, she married Viscount Alexandre Beauharnais. Two children were born to them—a son, Eugene, and a daughter, Hortense. The husband was one of the last victims of the Reign of Terror, for after the fall of Robespierre, he was led to the guillotine. Eugene, the young son of Josephine, presented himself before Bonaparte, then in command in Paris, and begged for his father's sword, which had been taken from him when he was imprisoned. When the general gave the boy the sword, the boy burst into tears and kissed it. The next day the boy's mother called on Napoleon to thank him for his kindness to her son; Bonaparte fell in love with her immediately, pursued and courted her persistently, and later the two were married.

When Bonaparte was made First Consul, Josephine was invaluable to him, and later, when the consulate became the empire, she conducted herself with tact and grace. Shortly



Photo: Visual Education Service

THE CORONATION OF JOSEPHINE
From the painting by David.

after the marriage of Napoleon and Josephine, the former purchased a little estate near Paris, called Malmaison, for his wife, and Josephine spent her happiest days there. When Napoleon was crowned emperor, and Josephine's time came to take part in the greatest drama of modern times, she descended from the throne and advanced to the altar of the cathedral where the newly crowned emperor awaited her. He took the little crown in his hands, placed it on his own head, then on hers, lifting it off once or twice in a playful manner, as if to assure her that she should wear it lightly.

The question of the



Photo: Visual Education Service

THE EMPRESS JOSEPHINE

succession to the throne became a grave one to Napoleon. He feared that if he died without issue, the splendid organization which he had created would be destroyed. He decided to divorce Josephine. After dinner one evening, he made his decision known to her, as gently as he could. Josephine's little boudoir was the scene of the final chapter of the great tragedy. It was here that the last good-byes were said. The empress begged her husband not to forget her. She promised to follow his wishes in caring for her health, to turn a deaf ear to gossip concerning him, and never to doubt his love. She spent the few remaining years of her

life at Malmaison. On March 12, 1810, Napoleon married Maria Louisa, daughter of the emperor of Austria. A year later, when the long-desired heir to the French throne was born and Josephine heard the cannon which announced the birth of a son, she called her people together and said: "We, too, must rejoice. I will give you a ball, and the whole city shall be glad with us." Soon after, without Maria Louisa's knowledge, Napoleon carried the babe to Malmaison, to Josephine, who had begged to see him.

When Napoleon was exiled at Elba, Maria Louisa was not permitted to join him. When Josephine heard of this decision, she wrote Napoleon, begging that she might come to him. He was obliged to deny her request, but before his answering letter reached Malmaison, Josephine had died. See BONAPARTE, NAPOLEON; MARIA LOUISA. E.D.F.

JOSEPH OF ARIMATHEA, a Jewish believer in Jesus who went boldly to Pilate after the Crucifixion to beg for the body of his Lord, that he might lay it in his own new tomb, which he had hewn out of a rock (*Matthew* xxvii, 60). Joseph was a member of the Sanhedrin, the chief governing body in the Temple. Though he did not consent to the resolution to put Jesus to death, he was afraid to say too much publicly in His favor. According to legend, Joseph carried to Britain the cup that Christ used at the Last Supper. This story is told in these volumes in the article HOLY GRAIL.

JOSEPHUS, *jo se' fus*, FLAVIUS (37- ?), whose real name was JOSEPH BEN MATTHIAS, was a Jewish historian, born in Jerusalem. He was of royal and priestly descent and related to the Maccabean house (see MACCABEES). On account of the ease, elegance, and accuracy of his historical writings, he was called the Hebrew Livy. Soon after the outbreak of the war between the Jews and the Romans, about the year 65, he was appointed governor of Galilee, and heroically but unsuccessfully defended that city against the Romans under Vespasian. He remained with the Roman army as a semi-prisoner for about three years, and witnessed the siege and fall of Jerusalem in A.D. 70. He then went to Rome with Vespasian, where he gained the imperial favor and adopted his Latinized name of *Josephus Flavius*. He is believed to have died during the reign of Domitian, and, according to some authorities, as a martyr to the Jewish faith.

Contributions to Literature. The familiar expression "Josephus' Works" means, generally, his *Jewish Antiquities*, a history of his countrymen from the earliest period down to the close of Nero's reign, comprising twenty books. His other authentic writings are a *History of the Jewish War*, in seven books, written both in Hebrew and in Greek, and an *Autobiography*.

JOSH BILLINGS, the pen name of Henry Wheeler Shaw. See SHAW, HENRY WHEELER.

JOSHUA (1537-1427 B.C., Biblical chronology), a military genius who after forty years as personal attendant on Moses in the Wilderness was divinely appointed his successor as prophet and leader of the Children of Israel. To Joshua was given the task of conquering Canaan and settling his people in their new home; so, upon the death of Moses, he began immediate preparations for crossing the Jordan. After seven years of warfare, all the thirty-nine kings who had occupied the Promised Land were subdued, and the country was distributed by lot among the Twelve Tribes, while their tabernacle was permanently placed at Shiloh (*Joshua* xviii, 1). Near the end of his life, he gathered the people together at Shechem, where he delivered a powerful address urging the people not to forsake God. He died at the age of 110 years.

The Book of Joshua, in the Old Testament, records the events and life of the Children of Israel as Joshua led them into the Promised Land after their long wandering in the Wilderness. The period covered in the book is about twenty-five years. Joshua, its traditional author, followed the example of his predecessor in writing down the history of his people, although the concluding verses, giving his final admonitions and recording his death, were written by another, probably a member of his tribe.

JOSIAH, *jo si' ah* (647-608 B.C.), the righteous king of Judah who greatly increased the prosperity of his country, which was maintaining its standing among the kingdoms only with great difficulty. He ascended the throne at the age of eight, upon the death of his father, Amon, and four years later began a crusade against idolatry by breaking down the images of Baal. In his eighteenth year, he started the work of repairing and adorning the Temple.

While this was being done, Hilkiah found the book of the law which had been lost for many years, and had it read to Josiah, who was greatly impressed with the warning concerning those who did not obey God (*Deuteronomy* xxix, 25-28). As a result, another assault against idolatry was begun, and the Valley of Hinnom, where children had been burned as offerings to Moloch, was defiled, so that it never could be used again. Then was held a wonderful Passover, which was so well attended and so solemn that nothing like it had been celebrated since the time of Samuel (*II Kings* xxiii, 1-25). Thirteen years later (616 B.C.), prompted by friendship for the king of Assyria, Josiah marched against Pharaoh Necho, who was on his way to attack that kingdom, and at Megiddo, where the two armies met, he was mortally wounded.

JOTHAM, *jo' tham*, father of Ahaz (which see).

JOULE. See UNIT (In Electricity).

JOURNALISM, *jur' nal iz'm*, **SCHOOLS OF**, whose purpose is the preparation of students for newspaper writing, have been established as departments or divisions of a number of leading colleges and universities in America. Though occasional lectures had been given on journalism previously, it was not until the first decade of the twentieth century that courses of practical value were introduced. Many universities offer special journalistic training as a part of the work of the English department, and the students publish a newspaper, usually a daily, on which they do all the work, including reporting, editorial writing, managing, and sometimes even typesetting and presswork.

The universities of the Middle West were the leaders in establishing regular courses. The University of Missouri maintains a school of journalism which has the same standing as its schools of medicine, law, and education; the degree given is that of Bachelor of Journalism. Another well-known institution in the Middle West is the Joseph Medill School of Journalism, a division of the School of Commerce of Northwestern University, Chicago. Columbia University is the only Eastern school that has a complete school of journalism. It was founded in 1912 through the generosity of Joseph Pulitzer of the New York *World* and Saint Louis *Post-Dispatch*, who donated for this purpose a fund of \$2,000,000. W.W.

Related Subjects. The reader is referred in these volumes to the following articles:

Pulitzer, Joseph Newspaper Pulitzer Prizes

JUAN, *hwahn*, **DON**. See **DON JUAN**.

JUAN DE FUCA, *hwahn' day foo' kah*, a strait separating Vancouver Island from the state of Washington. It connects Puget



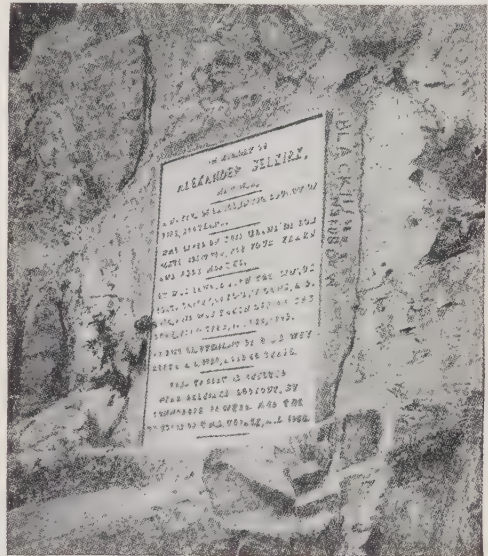
JUAN DE FUCA

Sound, on the south, with the Strait of Georgia, which separates Vancouver Island from the Canadian shore, on the north. It is of great commercial importance, as it is a part of the route by which ships go from Seattle, Vancouver, and Victoria to the Pacific Ocean. Juan de Fuca is about eighty miles long and has an average width of ten to eighteen miles. The shores are covered with heavy timber and are usually high and somewhat rocky.

The island of San Juan, at the eastern end of the strait, was the cause of a long-standing dispute between the United States and Great Britain, the question being whether it should be considered a part of British Columbia or of Washington. The German emperor, who arbitrated the issue, in 1872, decided that it should belong to Washington. The international boundary runs through the Strait of Haro, west of the island, as shown on the map. See **PUGET SOUND**.

Derivation of Name. The strait was named for Juan de Fuca, a sixteenth-century Greek navigator whose real name was Apostolos Valerianos. His claim to have discovered and navigated it was false, but his name remained.

JUAN FERNANDEZ, *hwahn fehr nahn'-dayth*, a group of volcanic islands in the Pacific Ocean, about 350 miles west of the city of Val-



THE SELKIRK MONUMENT

"In memory of Alexander Selkirk, mariner. A native of Largo, in the county of Fife, Scotland, who lived on this island in complete solitude, for four years and four months. He was landed from the *Cinque Ports* galley, 66 tons, 16 guns, A.D. 1704, and was taken off in the *Duke*, privateer, 12th Feb., 1709. He died lieutenant of H.M.S. *Weymouth*, A.D. 1722, aged 47 years. This tablet is erected near Selkirk's lookout by Commodore Powell and the officers of H.M.S. *Topaze*, A.D. 1868." So runs the inscription.

paraiso. The islands belong to Chile, and are politically included in the province of Valparaiso. The two largest islands are Mas-a-Tierra and Mas-a-Fuera. Mas-a-Tierra is an island of great beauty, thirteen miles long and four miles broad, and has about two score inhabitants.

The islands were discovered in 1563 by Juan Fernandez, a Spaniard who lived on the islands

for some time and stocked them with pigs and goats. The most famous resident, however, was Alexander Selkirk, whose residence there for four years (1704-1709) is said to have inspired the *Robinson Crusoe* of Daniel Defoe. The islands came into the possession of Chile at the beginning of the nineteenth century, and were for some time used as a penal colony by the government of that country. See ROBINSON CRUSOE; DEFOE, DANIEL.

JUAREZ, *hwah' rase*, BENITO (1806-1872), twice ruler of Mexico, was born of Indian parents in Oaxaca. He had a stormy political career, but he faced his foes with the courage of his race, rising from humble beginnings as a lawyer to the Presidency of the republic. As the Mexican government was bankrupt upon his accession, in 1861, he issued a decree suspending for two years all payments on public debts of every kind. This procedure led to the landing in Mexico of English, Spanish, and French troops. The French declared war, after the withdrawal of the first two powers, named Maximilian emperor, and drove Juarez and his adherents to the northern limits of the republic, where they maintained a stubborn resistance. Under the pressure of the American government, the French withdrew in 1867, when Maximilian was captured and shot. Juarez was reelected President in 1871. The last years of his activities were disturbed by frequent revolutionary attempts. He was always an exponent of liberal views. See MEXICO (History); MAXIMILIAN.

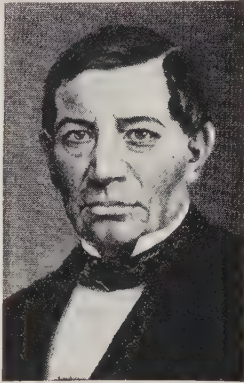


Photo: Brown Bros.

BENITO JUAREZ

Memorials to Juarez. The city of Juarez, across the international boundary from El Paso, Tex., was named for him, and there is a monument to his memory in nearly every large city of the republic.

JUBAL, inventor of the harp (which see).

JUBILEE, the fiftieth anniversary of any enterprise or institution. The name and idea are borrowed from the ancient Hebrews, who proclaimed each fiftieth year a year of atonement and rejoicing. At the end of the forty-ninth year, the trumpet was sounded; during the year following, the lands lay fallow, slaves were set at liberty, families were reunited, and lands returned to their original owners or their heirs.

In the Roman Catholic organization, the jubilee is the occasion of unusual spiritual privileges. The word now is frequently em-

ployed in a sense signifying a period of merry-making.

JUCA. See CASSAVA.

JUDAH, one of the twelve patriarchs, son of Jacob and Leah. The name also is given to the tribe descended from Jacob, through his son. See JACOB.

JUDAISM, *joo' da iz'm*. See JEWS.

JUDAS, OR **LEBBEUS**. See APOSTLES.

JUDAS ISCARIOT. See APOSTLES.

JUDAS TREE, so called because tradition says that Judas hanged himself on one of that species, is one of the poplars, native to Southern Europe. It has large leaves and delicate rose-colored flowers, which appear before the leaves. The American Judas tree is a very hardy poplar, grows to a height of forty feet, and is very similar to the European variety. Both have an unusual black-veined wood, which is strikingly beautiful when polished. See APOSTLES (Judas Iscariot).

JUDE, *jewd*, a short epistle of only twenty-five verses, which forms one book in the New Testament and was probably written by Judas, a brother of James. Its date, place, and occasion are unknown, but it seems to denounce the same false teachers as those rebuked in the second chapter of *II Peter*. It is remarkable in that it quotes a saying of Enoch (verse 14), and a dispute between the archangel Michael and Satan regarding the body of Moses (verse 9). The writer warns some certain body of Christians, which he seems to be addressing, of future judgment and punishment of the wicked, through the examples of the fallen angels, of Cain, Korah, and Balaam, and of the wicked cities of Sodom and Gomorrah.

JUDEA, *ju de' ah*, the name given at the time of Christ to the southern division of Palestine, which formerly had been occupied by Dan, Judah, Simeon, and Benjamin, four of the Twelve Tribes of Israel. The Mediterranean Sea bounded the country on the west, the Jordan and the Dead Sea on the east, Samaria was the province directly north of it, and Arabia Petraea extended over considerable territory on the south. Although Jesus was born in



LOCATION MAP

Bethlehem, a small town in this province, most of His great work was done in distant Galilee or Samaria, so Jerusalem was its only

important city in New Testament history. At present the region is a rather desolate, hilly country in the southern part of Syria.

JUDGE, one who presides in a court of law. The judges of the highest courts in Great Britain and of the Supreme Court of the United States are called *justices*. Justices of the peace and magistrates are not regarded as judges.

Where there is no jury, it is the duty of the judge to determine, from the testimony given, the facts in the case and the law which applies to them. If there is a jury, the judge in most states decides all questions of law arising in a case; the jury, all questions of fact. In criminal cases, the jurymen determine the guilt or innocence of the prisoner, and if they find him guilty, the judge imposes the sentence prescribed by law.

In Great Britain and in Canada, judges are appointed by the Crown and serve for life. In the United States, the Federal judges are appointed for life by the President, subject to the approval of the Senate; all others, whether state, county, municipal, or circuit-court judges, are elected for a term of years (usually six), by the people. Elected judges may be recalled by popular vote in a few of the American states. For misconduct, American Federal judges can be removed from office through impeachment proceedings, and Canadian judges by the Governor-General.

Related Subjects. The reader is referred in these volumes to the following articles:

Courts	Law
Impeachment	Procedure
Justice of the Peace	Recall

JUDGE-ADVOCATE GENERAL. See NAVY, DEPARTMENT OF THE.

JUDGES, BOOK OF, an historical book of the Old Testament in which the life of the Children of Israel is described under the rule of the judges, or deliverers of the country. These were the only rulers of the nation for many years after Joshua led the Israelites into the Promised Land. After a short account telling about the subjection of the land after Joshua's death, the history of the rule of six judges is given in detail, while six others are briefly mentioned. These judges, as heroes of the people, were obeyed by most of the nation, thus preparing the way for Saul to be anointed the first king of the united country. The wonderful Song of Deborah, the story of Gideon's army of 300 conquering the Midianites, and the account of Samson's great strength, as well as his reckless valor, are all found in this book, which was probably written by Samuel, although authorities disagree as to its authorship. The period covered by the book is about 350 years.

Related Subjects. The reader is referred in these volumes to the following articles:

Deborah	Joshua
Gideon	Samson

JUDGMENT, one of the most important of the intellectual activities; it is the typical act of intelligence. To think is to a great extent to judge. In its widest sense, it means the power of weighing facts in order to reach a conclusion or a decision. Sound judgment is the ability to see things in their proper relation.

In its narrower and more technical sense, as used in psychology, judgment means the power we possess to discern the relation of similarity or difference between objects or ideas. A judgment is the assertion of a truth; that is, of that which corresponds with reality. That is why we say that to judge is to discern truth relations. I discern the relation between the ideas of honesty and welfare in life, and I arrive at the judgment: "Honesty is the best policy." We also find differences between notions, as in the judgment: "This dog is not a terrier." To judge is to affirm or deny one thing of another, and the result of the act of judging is called a judgment. Every judgment can be put in the form of a sentence or proposition. In each proposition there are three elements: the subject, the predicate, and the relation of agreement or disagreement we find between them, as the result of our act of judging. The examples above will illustrate this.

Ideas, concepts, and percepts are the materials from which we elaborate our judgments. These are supplied partly by our personal experiences and partly by the testimony of others, which we have acquired by our education and reading. The better educated a person is, the greater is his power of forming correct, strong, and independent judgments, and a person who forms such judgments will express them in clear, accurate, and concise statements. C.E.S.

Related Subjects. The reader is referred to the following articles in these volumes:

Concept	Psychology
Perception	Reason

JUDGMENT, in law, is the conclusion based upon facts developed in the trial, or admitted by the parties, or upon their default in the course of the suit. It becomes the law governing the case unless it is set aside or reversed by a higher court. Judgment without comment on the rights of the parties to a suit may be given, either *in default*, when no defense is made, or as a *confessed judgment*, when the defendant admits claims against him. In some states and provinces, a judgment of money owing becomes a *lien* upon the debtor's real estate; elsewhere, an *execution* is necessary. See LIEN; EXECUTION; DEBT.

JUDGMENT, SNAP. See REASON.

JUDICIARY, *joo dish' ih ay rie*. See COURTS.

JUDITH, a Biblical heroine, the widow of Manasses of Bethulia. When Holofernes, a general of the king of Assyria, besieged her native city, she went to the tent of the invader and was admitted because of her striking

of Minnesota. Seven years later, he became professor of political science at the new University of Chicago, and in the following year was made head of his department and dean of the faculties. He was very closely associated with



JUDITH

The heroine is shown as the youthful figure at the left. The illustration is a portion of a painting by Rubens. Judith and her attendant are standing near the severed head of Holofernes.

beauty. During the banquet held in her honor, Holofernes drank deeply and fell into a profound sleep. Judith then beheaded him with his own sword, and was hailed as the deliverer of Israel. Her history is given with much skill in the Apocryphal book of *Judith*, and has inspired many sculptors and painters. It is the subject of Donatello's bronze group in the Lanzi Palace at Florence, and of Horace Vernet's pictures, entitled *Judith on Her Way to Holofernes* and *Judith in the Tent of Holofernes*. The story was also carefully dramatized, for the moving-picture industry, as *Judith of Bethulia*; a magnificent and characteristic setting was provided, and millions of people were given an instructive lesson in Hebrew history.

JUDSON, ADONIRAM (1788-1850). See **MIS- SIONS AND MISSIONARIES** (Protestant Missions).

JUDSON, HARRY PRATT (1849-1927), the second president of the University of Chicago and an authority on theoretical and practical politics and international law. Born in Jamestown, N. Y., he received his education at Williams College, and from 1870 to 1885 served as principal of the Troy (N. Y.) High School, in the meantime securing his master's degree. In 1885 he removed to the West and took the chair of history and pedagogics in the University

of Minnesota. Seven years later, he became professor of political science at the new University of Chicago, and in the following year was made head of his department and dean of the faculties. He was very closely associated with President Harper and was in thorough sympathy with the latter's policies. When President Harper died, in January, 1906, Dean Judson was made acting president; in the next year he was formally appointed president. In 1923 he resigned his office and retired to private life. See **CHICAGO, UNIVERSITY OF**.

His Works. Judson was the author of a number of works on history and political science, including *Caesar's Army, Europe in the Nineteenth Century, The Growth of the American Nation, The Essentials of a Written Constitution, Higher Education as a Training for Business*, and *The Young American*.



Photo: U & U

HARRY PRATT JUDSON

JUDSON COLLEGE. See **ALABAMA**.

JUGGERNAUT, *jug' ur nawt*, a term from the Sanskrit, meaning *lord of the world*, is the

name given to a celebrated temple and idol of Hindustan, in the presidency of Bengal. This shrine, the most renowned in Hindustan, was completed in the twelfth century at enormous expense. The idol is a carved block of wood, with hideous black face, distended, blood-red mouth, and eyes made of precious stones. The idol rests on a throne between two others—his brother Bala-Rama and his sister Subhadra. On festival days the throne of the Juggernaut was placed on a high tower which moved on wheels, and the people pulled it along by ropes. The belief that devotees cast themselves in front of this car to be crushed to death probably grew out of the accidental fatalities which sometimes occur. No such deliberately intended sacrifices have been made within two centuries. Every year crowds of pilgrims worship at this shrine.

JUGGLER OF NOTRE DAME. See **OPERA** (Some of the Famous Operas).

JUGO-SLAVIA, the former spelling of *Yugoslavia*, the common designation of the country known until 1929 as the Kingdom of the Serbs, Croats, and Slovenes. See **YUGOSLAVIA**.

JUGULAR VEIN, *joo' gu lahr vane*, from the Latin *jugulus*, meaning *collar bone*, is the name given to the four large veins which return blood to the heart from the head and neck. There are two on each side of the neck, known as the *external* and *internal* jugulars. One lies close to the surface

and carries blood from the external portions of the head and neck; the second lies deeper,

and carries blood from the interior of the cranium. This vein is much larger, and is the one we usually think of when speaking of the *jugular vein*. Some veins may be severed without serious consequences, but the cutting of an internal jugular vein is usually fatal. This is due to the fact that the quantity of blood supplied to the brain is very great, and when an internal jugular vein is cut, there is a serious and very rapid loss of this life-giving substance. See **VEINS**. K.A.E.

JUGURTHA

(? -104 B.C.), a Numidian prince, who gained and lost the throne of his country by treachery and cunning. Numidia was an ancient country of North Africa, the various tribes of which had been united by Masinissa, grandfather of Jugurtha. The latter was a finely gifted youth, an expert horseman, and skilful in war-craft. In 134 B.C. his uncle, then king, sent him into Spain at the head of a Numidian force fighting with the Romans. While upon this expedition, he became the friend of Scipio Africanus Minor and other influential Romans.

Upon the death of his uncle, in order to obtain sole possession of the throne, he killed one cousin and drove another from the country. The latter appealed to Rome, and as a consequence was given the rule of the eastern part of Numidia, and Jugurtha the western. In a short time, Jugurtha, becoming dissatisfied besieged and killed

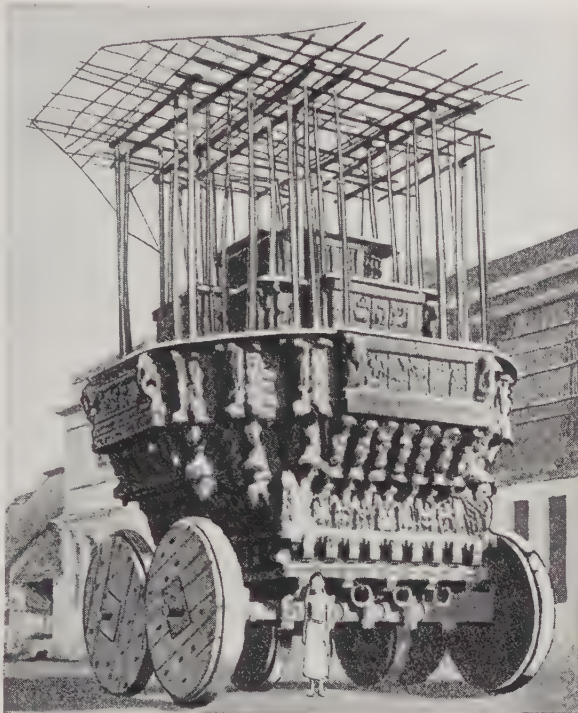
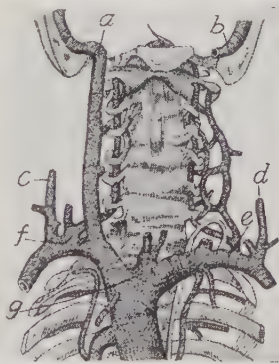


Photo: Ewing Galloway

JUGGERNAUT CAR

The body is modeled after a temple of the original Juggernaut of the twelfth century. The British forbid the natives to roll it through the streets, fearing that fanatics will throw themselves under it, as was the habit two centuries ago.



JUGULAR VEINS

- (a) Right internal jugular vein;
- (b) Left internal jugular vein;
- (c) Right external jugular vein;
- (d) Left external jugular vein;
- (e) Left subclavian vein; (f) Right vertebral vein; (g) Mammary vein.

his cousin and the Romans who were with him at the time. Through the influence of Roman friends and rich bribes, he was able for many years to evade the consequences of his crime, but was at last captured by Marius and brought to Rome. As a punishment he was forced to march in the procession celebrating the triumphs of Marius, and was then thrown into the Tullianum, an underground prison, to die an ignominious death. The Jugurthine War is the subject of a celebrated essay by the Roman historian Sallust. See **MARIUS**, **CAIUS**.

JUJUBE TREE. See **LOTUS** (The Lotus-Eaters).

JUJUTSU, OR **JIJUTSU**, *joo jit' soo*, a highly developed, weaponless art of defense or offense, the foundation of the system of physical culture of the Japanese. It was probably known as early as the seventh century B.C., and was long a closely guarded secret art, practiced only by the nobility. It is now taught in some Japanese schools, to both boys and girls, and soldiers, sailors, and policemen are required to perfect themselves in it. Since the beginning of the twentieth century, schools for training in jujutsu have been established in Europe and the United States.

The art consists in making various dexterous twists, blows, or grips which disable an antagonist by rendering useless certain parts of his body, and this requires a certain knowledge of anatomy. Unlike wrestling, it does not depend on muscular strength, for one who understands the art may easily overpower a much larger opponent. At the beginning of a bout, the combatants grasp each other by the collar and proceed to maneuver for an advantageous position by pulls, jerks, and pushes. Blows are delivered by the open hand. One of the important methods is that of yielding to the opponent. The aptness of the interpretation of the term *to conquer by yielding* is shown in the following passage from Lafcadio Hearn's *Out of the East*:

In jujutsu there is a sort of counter for every twist, wrench, pull, push, or bend: only the jujutsu expert does not oppose such movements. No; he yields to them. But he does much more than that. He aids them with a wicked sleight that causes the assailant to put out his own shoulder, to fracture his own arm, or, in a desperate case, even to break his own neck or back.

The study and practice of jujutsu gives valuable physical training. It compels a student to adopt a light, nourishing diet, to get plenty of sleep, to practice deep-breathing exercises, and to forego all intemperate habits.

JULIAN, *jool' yan*, in full, **FLAVIUS CLAUDIUS JULIANUS** (331-363), emperor of Rome from 361 to 363, surnamed *the Apostate* on account of his attempt to restore the pagan worship. He was an able ruler and also noted as a

writer. He was born at Constantinople, and was the son of Julius Constantius, brother of Constantine the Great. When Constantius II, son of Constantine, massacred the royal family, Julian and his brother Gallus were spared. On the death of his brother, Julian was sent to Milan by Constantius, but was subsequently allowed to go to Athens, where he studied philosophy, became a disbeliever in Christianity, and espoused paganism. Having been appointed commander of an army against the Germans, he defeated them at Strassburg and also compelled the Franks to make peace. He became very popular in consequence, and when he was ordered by Constantius to set out for the East, the troops rebelled and proclaimed him emperor (360).

The only obstacle to his attainment of imperial honors was removed by the death of Constantius, which occurred soon after, and on the eleventh of December, 361, Julian made his triumphant entrance into Constantinople. He endeavored to restore paganism in all its magnificence, but surprised his subjects by his edict of toleration; although he opposed Christianity, he did not persecute the followers of the new faith.

JULIANA, Princess of the Netherlands and heir apparent to the Dutch throne. See **WILHELMINA**.

JULIAN CALENDAR. The name given to the Roman calendar, after important changes had been made in it by Julius Caesar. See **CALENDAR**; **EPOCH**; **NEW YEAR**.

JULIAN PERIOD. See **EPOCH**.

JULIUS, *jool' yus*, the name of three Popes of Rome, who occupied the Papal chair between A.D. 337 and 1555.

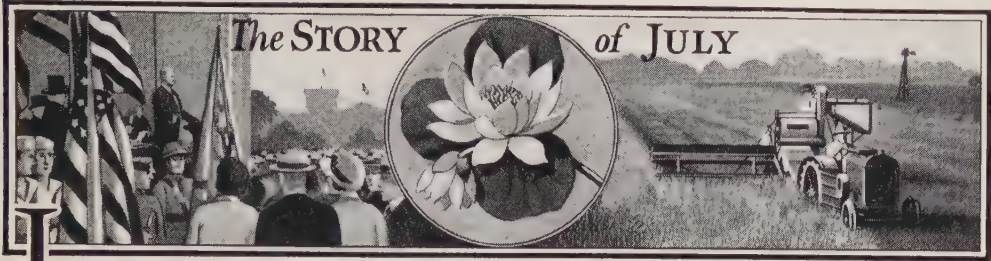
Julius I, **SAINT**, was Pope from 337 to 352. His reign fell in troubled times, when the Church was divided over the Arian controversy. The followers of Arius, who denied that Christ was equal with the Father, preferred grievous charges against Saint Athanasius, which the Pope dismissed with indignation. With the Emperor Constans, he called the Council of Sardica. His day is observed on April 12.

Julius II, Pope from 1503 to 1513, was a great statesman and a liberal and judicious patron of the fine arts. He devoted all his energies to the complete restoration of Papal sovereignty, and to the extinction of foreign domination in Italy. He laid the corner stone of Saint Peter's Church, and his two great diplomatic feats were the formation of the League of Cambrai in 1508, and of the Holy League in 1512.

Julius III, Pope from 1550 to 1555, was born at Rome in 1487. While officiating as cardinal, he was chosen as one of three legates to open and preside over the Council of Trent (see **TRENT**, **COUNCIL OF**). As Pope, in 1551, he reopened this Council after its sittings had been discontinued for two years. He was zealous and optimistic, and in this spirit sent Cardinal Pole to England to endeavor to bring the English Church once more within the pale of Rome. Disheartened by failure, he died in 1555.

JULIUS CAESAR. See SHAKESPEARE, WILLIAM (Synopsis of the Plays); CAESAR, CAIUS JULIUS.

JULLIARD MUSICAL FOUNDATION. See EDUCATIONAL FOUNDATIONS (Other Benefactions).



JULY, the MONTH OF JULIUS, is the seventh month of the year, according to the modern calendar. The earliest Roman calendar made it the fifth month, and gave it the name of *Quintilis*, which means *fifth*, but it had the honor to be the birth month of the great Julius Caesar, and when his calendar reform went into effect, it was rechristened for him. Previous to Caesar's time, it had but thirty days, but in pride he added an extra day, to give it the same length as the longest months. The special flower of July is the water lily, and its gem the ruby. See **CAL-
ENDAR**.

Its Character. Summer begins in June, but reaches its full maturity in July, which in the north temperate regions is likely to be the hottest month of the year. Usually, however, the heat is not so oppressive as it is earlier or later in the summer, for in most localities the air is rather dry and clear. Under the burning sun, the grass and leaves begin to lose the freshness and greenness of June, and in absence of rain, the fields are often burnt quite brown by the last of the month. Flowers thrive, however, and many of the most brilliant of them are in their prime. The roses have not quite gone, and the poppies, the dahlias, the sweet peas, and the nasturtiums are in full bloom. The air is full of the hum of insects, birds dart everywhere in search of food, and over wayside flowers, the butterflies hover. All in all, it is a season of abundant life, and if he chooses, the child released from school can learn more of nature in this one month than in several months of formal "nature study" in the classroom.

Special Days. Both Canada and the United States have days for very special observance

in July. Canada celebrates the first of the month as Dominion Day (which see), the day on which the Confederation Act went into effect; while in the United States, July 4 is observed as Independence Day (which see), in memory of the adoption of the Declaration in which the colonies announced their independence of Great Britain. The French honor July 14 as the anniversary of the fall of the Bastille (which see), and on some of these celebrations, hundreds of prisoners have been pardoned and released. Three Presidents of the United States died on July 4—Jefferson and John Adams in 1826, and Monroe in 1831.

JULY, COLUMN OF. See **JULY REVOLUTION**, subhead.

JULY REVOLUTION. This uprising of the French people against their tyrannical king, Charles X, was so called because it occurred in July. On the downfall of Napoleon, 1815, the line of Bourbon kings was restored in the person of Louis XVIII. Both he and his brother Charles, his successor, adopted a despotic policy, and when, in July, 1830, Charles issued edicts interfering with the liberty of the press and making arbitrary

changes in the laws regulating the right to vote, the people of Paris rose in revolt. As a result, Charles was dethroned, and Louis Philippe, a member of the younger branch of the Bourbon family, was given the crown. The influence of the July Revolution was felt throughout Europe, especially in the Netherlands, where the Belgians revolted and declared themselves independent of Holland.

Column of July, a pillar of bronze, erected in Paris on the site of the famous Bastille of the French Revolution (see **BASTILLE**). It was designed as a memorial to the 651 citizens who fought and died for the



COLUMN OF JULY

JULY CALENDAR

Birthdays

2. Sir Charles Tupper, 1821
3. John S. Copley, 1737
4. Nathaniel Hawthorne, 1804
- Calvin Coolidge, 1872
- Stephen C. Foster, 1826
5. Sarah Siddons, 1755
- David G. Farragut, 1801
6. John Huss, 1373
- John Paul Jones, 1747
8. Fitz-Greene Halleck, 1790
- John D. Rockefeller, 1839
9. Elias Howe, 1819
10. John Calvin, 1509
- Sir William Blackstone, 1723
11. John Quincy Adams, 1767
12. Julius Caesar, 100 B.C.
- Henry D. Thoreau, 1817
14. Cardinal Mazarin, 1602
15. Rembrandt, 1606
- Henry E. Manning, 1808
16. Sir Joshua Reynolds, 1723
- Mary Baker Eddy, 1821
17. Andrea del Sarto, 1487
- Isaac Watts, 1674
- John Jacob Astor, 1763
18. William Makepeace Thackeray, 1811
19. Samuel Colt, 1814
20. Francisco Petrarck, 1304
23. James Gibbons, 1834
24. Alexander Dumas, the Elder, 1802
- J. G. Holland, 1819
- Simon Bolivar, 1783
25. Arthur James Balfour, 1848
- Maxfield Parrish, 1870
26. George Clinton, 1730
- Sir John Beverley Robinson, 1791
- Jean Baptiste Corot, 1796
27. Thomas Campbell, 1777
- Alexander Dumas, the Younger, 1824
29. Alexis de Tocqueville, 1805
30. Samuel Rogers, 1763
32. Henry Ford, 1863
31. John Ericsson, 1803

Events

1. Debate on Declaration of Independence began, 1776
- Beginning of Battle of Gettysburg, 1863
- Canadian Confederation Act went into effect, 1867
- Battle of El Caney, 1898
2. President Garfield shot, 1881
- San Juan Hill occupied by Americans, 1898
3. Last day of Battle of Gettysburg, 1863
- Idaho admitted to the Union, 1890
4. Declaration of Independence signed, 1776
- Surrender of Vicksburg, 1863
- Dedication, at Louvain, Belgium, of the new library, 1928
5. British retook Ticonderoga, 1777
- Battle of Wagram, 1809
- William Booth founded Salvation Army, 1865
6. John Huss burned at the stake, 1415
7. Independence of Haiti proclaimed by Toussaint, 1801
- Allies entered Paris, 1815
- United States annexed Hawaii, 1898
8. Battle of Poltava, 1709
- Great fire at Saint John's, Newfoundland, 1892
9. Braddock's defeat, near Fort Duquesne, 1755
- Canada proclaimed an amnesty for participants in Riel's Rebellion, 1886
- World's first merchant submarine reached America from Germany, 1916
10. Inauguration of Millard Fillmore, 1850
- Wyoming admitted to the Union, 1890
- Canadian Parliament passed copyright bill, 1900
11. Alexander Hamilton mortally wounded in a duel with Aaron Burr, 1804
12. Peace of Villafranca, 1859
13. Ordinance of 1787 adopted, 1787
15. Cawnpore captured by General Havelock, 1857
- France declared war on Germany, 1870
16. District of Columbia established, 1790
17. Charles VII of France crowned at Rheims through efforts of Joan of Arc, 1429
18. Allies began their last offensive on the Western Front, 1918
20. Trial of Louis Riel begun at Regina, Canada, 1885
- Quebec began celebration of its tercentenary, 1908
21. English fleet attacked the Armada, 1588
- First Battle of Bull Run, 1861
24. British took Gibraltar, 1704
- Mormons reached Salt Lake, 1847
25. Battle of Lundy's Lane, 1814
26. Nova Scotia taken from France by England, 1758
- Disestablishment of the Irish Church, 1869
27. Colonial army invested Boston, 1775
28. Robespierre guillotined, 1794
- Alabama left Birkenhead, England, 1862
29. Austria-Hungary declared war on Serbia, 1914
- Boer force near Middleburg surrendered to Kitchener, 1901
- Austrians occupied Lublin, 1915
31. Columbus discovered island of Trinidad, 1498

For Study

Ant
Blackberry
Bobolink
Bumblebee
Clover

Declaration of Independence
Dominion Day
Fish
Flag
Grasshopper

Heron
Independence Hall
La Fontaine's Fables
Mosquito
Sun

QUOTATIONS FOR JULY

1. From our Dominion never
Take thy protecting hand!
United, Lord, forever,
Keep thou our fathers' land!
John Campbell, Duke of Argyll.
 2. Then came hot July, boiling like to fire,
That all his garments he had cast away.
Spenser.
 3. How sleep the brave who sink to rest
By all their country's wishes bless'd!
Collins.
 4. When Freedom, from her mountain height,
Unfurled her standard to the air,
She tore the azure robe of night,
And set the stars of glory there.
Drake.
 5. I have closed my books and hidden my slate,
And thrown my satchel across the gate.
My school is out for a season of rest,
And now for the schoolroom I love the best.
Bates.
 6. Such is the patriot's boast, where'er we roam,
His first, best country ever is at home.
Goldsmith.
 7. My country's good with a respect more tender,
More holy and profound, than mine own life.
Shakespeare.
 8. No path of flowers leads to glory.
La Fontaine.
 9. A peace no other season knows,
Hushes the heavens and wraps the ground.
Bryant.
 10. Our fathers fought for liberty,
They struggled long and well;
History of their deeds can tell—
But ourselves must set us free.
Lowell.
 11. This hand, to tyrants ever sworn the foe,
For Freedom only deals the deadly blow.
J. Q. Adams.
 12. Loud is the summer's busy song,
The smallest breeze can find a tongue,
While insects of each tiny size
Grow teasing with their melodies,
Till noon burns with its blistering breath
Around, and day lies still as death.
Clare.
 13. They are slaves who dare not be
In the right with two or three.
Lowell.
 14. When the scarlet cardinal tells
Her dream to the dragon fly,
And the lazy breeze makes a nest in the trees
And murmurs a lullaby,
It is July.
Sweet.
 15. O native land! through weal and woe,
Thou hast my heart where'er I go.
Peck.
 16. And look at the broad-faced sun, how he smiles
On the dewy earth that smiles in his ray,
On the leaping waters and gay young isles;
Ay, look, and he'll smite thy gloom away.
Bryant.
 17. I must be measured by my soul!
The mind's the measure of the man. *Watts.*
 18. Where'er one man may help another—
There is the true man's birthplace grand;
His is a world-wide fatherland!
Lowell.
 19. Were half the power that fills the world with
terror,
Were half the wealth bestowed on camp and
courts
Given to redeem the human mind from error,
There were no need of arsenals nor forts.
Longfellow.
 20. The Summer looks out from her brazen tower,
Through the flashing bars of July.
Thompson.
 21. Breathes there the man with soul so dead
Who never to himself hath said,
This is my own, my native land?
Scott.
 22. When faith is lost, when honor dies,
The man is dead. *Whittier.*
 23. My schoolroom lies on the meadow wide,
Where under the clover the sunbeams hide,
Where the long vines cling to the mossy bars,
And the daisies twinkle like fallen stars.
Bates.
 24. The crowning fact
The brightest act
Of Freedom is the freeman's vote.
Whittier.
 25. The love of liberty with life is given,
And life itself the inferior gift of Heaven.
Dryden.
 26. And how can man die better
Than facing fearful odds
For the ashes of his fathers
And the temples of his gods?
Macaulay.
 27. Britannia needs no bulwarks,
No towers along the steep;
Her march is o'er the mountain waves,
Her home is on the deep.
Campbell.
 28. When the heat like a mist veil floats,
And poppies flame in the rye,
And the silver note in the streamlet's throat
Has softened almost to a sigh,
It is July.
Sweet.
 29. Strike—for your altars and your fires!
Strike—for the green graves of your sires!
God, and your native land! *Halleck.*
 30. And feeling hearts, touch them but lightly, pour
A thousand melodies unheard before!
Rogers.
 31. They love their land, because it is their own,
And scorn to give aught other reason why.
Halleck.
- Before green apples blush,
Before green nuts embrown,
Why, one day in the country
Is worth a month in town.
Rossetti.
- I remember, I remember
How my childhood fled
The mirth of its December,
The warmth of its July.
Præd.

liberty of France, July 27, 28, and 29, 1830. The names of the revolutionists are carved on the column, and the bodies of these victims are entombed in the vaults below, as are also the bodies of those who were killed in the Revolution of 1848. Ascent is made to the top of the column, 154 feet above the ground.

JUMBO. See BARNUM, PHINEAS TAYLOR; ELEPHANT.

JUMNA, a great river of Northern India, one of the important tributaries of the Ganges. It rises in the Himalayas, flows in a general southerly direction, and falls into the Ganges below Allahabad. Two canals, the eastern and western Jumna canals, lead from it, and in the hot season they draw off much of its water to irrigate the dry plains. The total length of the Jumna is almost 900 miles, and its drainage basin has an area from 118,000 to 120,000 square miles.

JUMPING, a form of athletics which from very ancient times has been popular. The early Olympian games record feats in jumping; it is declared in Greek chronicles that one Phayllus established a record of thirty feet, with the assistance of weights carried in the hands and cast backwards at the instant when he began to spring.

To-day two forms of this athletic exercise are popular in public exhibitions of skill; these are the running long jump, or broad jump. Not so popular in public exhibitions are the standing high and long jumps, for the reason that they are less spectacular. Quite outside of athletic contests, usually, are the hop, step, and jump, started from either a standing position or preceded by a sprint of from twenty to thirty feet.

The record for the running broad jump is 25 feet 4¾ inches, achieved in the Olympic games at Amsterdam in 1928. The record for the hop, step, and jump, also made at the Amsterdam stadium in the same year, was 49 feet 10¾ inches. The running high jump record is 6 feet 4¾ inches.

JUMPING BEAN, the seed of several plants of the spurge family, grown in Central and South America. The seed gets its peculiar name from its activity when inhabited by the full-grown larva of a certain gray moth, which has the name of *Carpocapsa saltitans*. The seeds are somewhat triangular in shape, and are made to roll from side to side as well as to jump. They are imported into the United States, where they are called *Mexican jumping beans*, or *broncho beans*. The latter is a local name in the Southwest. G.M.S.

JUMPING BULL. See SITTING BULL.

JUMPING MOUSE, another name for the deer mouse (which see).

JUNCO, *jung' ko*, the general name for certain small "snowbirds" of the finch family. When the approach of cold weather drives the insect-eating birds far to the south, the

seed-eating juncos come down from the north and gather in flocks about the fields, hedges, and yards. They can be tempted to stay throughout the winter near a window shelf if given crumbs and grain seeds. The *slate-colored junco* of Eastern United States and Canada is a well-known species found everywhere in winter between New England and



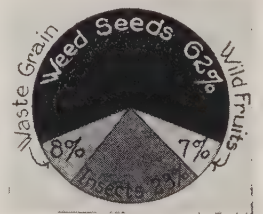
JUNCO

the Gulf of Mexico. It breeds from Northern New England and Northern New York northward, migrating south in September and returning in April. It is about six and one-half inches long, and may be recognized by its slate-gray back, white under parts, and white outer tail feathers, which are very conspicuous when the bird is on the wing. The junco is beneficial because it eats great quantities of weed seeds and, in season, caterpillars and other insects. Its nest, hidden in grass or brush on the ground, contains three to five bluish-white eggs, speckled with reddish-brown. The juncos breed mostly in the evergreen forests of the Northern states and Canada,

but in the fall and spring they are the most abundant small migrants south of their breeding range, as far as the Gulf states. A few remain in the Northern states all winter. D.L.

Scientific Names. The juncos belong to the family *Fringillidae*. The slate-colored is *Junco hyemalis*. Other species include the white-winged, *Junco oreganus*, which winters in Colorado; the gray-headed, *J. caniceps*, of the Rocky Mountains; and various subspecies of these.

JUNCTO. See JUNTA.



WHAT THE JUNCO EATS



JUNE, the sixth month of the year, has always been the favorite month of poets. "The leafy month of June," one of them calls it, and rightly, for during its long days the trees and shrubs are at their freshest and best, and the flowers are most plentiful and richest in color. Especially, it is the month of roses.

No less truly is June the month of brides. This is no modern idea, but dates back to early Roman days. May was a particularly unlucky month for weddings, the ancients thought, but June, especially that part when the moon was at the full, was better than any other month. And all through the Middle Ages this superstition remained in force. The beauty of the month, and the luxuriance of its flowers, do indeed fit it well for all festivities, as does the fact that in most localities June has as many days of sunshine as any other month.

The Month's History. It was the Romans who named June, which with them was the fourth month of the year. Some authorities believe that its name was taken from that of Juno, and this seems reasonable enough, for the great queen of the gods was the patron deity of marriage (see JUNO); but more probably it was derived from *juniores*, for this month was specially dedicated to the younger men, as the preceding one was to their elders. In the time of Romulus (which see), the month had thirty days. Later it lost four of these, then regained three; so when Julius Caesar began his reform of the calendar, it had but twenty-nine. He added the extra day, and ever since, June has had thirty days.

June Activities. June is a busy month in nature. "Fruits that shall swell in sunny June," wrote Bryant; when June comes, the blossoms of the fruit trees have had their day, and the tiny green fruit is beginning to appear. The bees, too, are busy, carrying home honey and helping to fertilize the flowers, though of this they are not aware.

A swarm of bees in June
Is worth a silver spoon,

says an old rhyme. Butterflies hover over the roadside flowers, and the mother birds brood over their eggs, while their mates sing to them and bring them food.

June is not so much a time of transition as is May, for summer has really come, but it is a season of undiminished activity, when the

"letting down and the drying up" which come in the hotter months of July and August have not yet begun. No month has more to interest the children or to draw them out-of-doors. The study of the bee and the butterfly, of many of the sweetest flowers, and of certain phases of the "home life" of the birds may well be undertaken at this time.

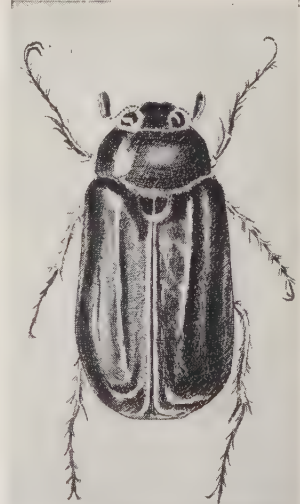
The lists of birthdays, events, and suggestions for study will suggest to the teacher or parent many special talks or exercises, which can be of varying length, as befits the importance of the subject. Flag Day, June 14, is now quite generally celebrated in schools. See FLAG; also pages 3714 and 3715.

JUNEAU, *ju no'*, the capital of Alaska, described in the article on that territory.

JUNEAU, LAURENT SOLOMON. See MILWAUKEE (Wis.).

JUNE BUG, OR **MAY BEETLE**, popular names for various large brown beetles prevalent in America in May and June, but most common in May, when

they begin to emerge from the pupal cells in the ground. They are seen chiefly at night when, attracted by light, they fly about street lamps in great numbers and find their way into lighted rooms. There they often bump awkwardly into furniture and people, falling helplessly to the floor and kicking and struggling until they right themselves for another flight. They eat the young leaves of



JUNE BUG

The insect pictured is one and three-fourths times natural size.

forest trees and shrubs and often do much damage. Their eggs are deposited in the

(Continued on page 3716.)

JUNE CALENDAR

Birthdays

2. John Randolph of Roanoke, 1773
3. George V of England, 1865
4. George III of England, 1738
5. Socrates, 469 B.C.
6. Nathan Hale, 1755
8. Charles Reade, 1814
John Everett Millais, 1829
Robert Schumann, 1810
9. John Howard Payne, 1792
10. Henry M. Stanley, 1841
12. Charles Kingsley, 1819
13. Winfield Scott, 1786
Thomas Arnold, 1795
14. Harriet Beecher Stowe, 1811
15. Edvard Grieg, 1843
17. John Wesley, 1703
22. H. Rider Haggard, 1856
23. Josephine, empress of the French, 1763
28. Henry VIII of England, 1491
Jean Jacques Rousseau, 1712
29. Peter Paul Rubens, 1577

Events

1. Kentucky admitted to American Union, 1792
Tennessee admitted, 1796
Two-cent postage established between United States and Great Britain, 1908
2. Beginning of Reign of Terror in French Revolution, 1793
3. First steam vessel arrived in Boston from England, 1840
4. Treaty of peace between United States and Tripoli signed, 1805
Woman-suffrage amendment adopted in the United States, 1919
5. First public balloon ascension, in France, by Montgolfier brothers, 1783
Monoplane flight of Chamberlin and Levine between Long Island and Germany, 1927
8. Lincoln nominated for President, 1864
10. Navigation Acts enforced in colonies, 1664
A committee appointed by Colonial Congress to draw up Declaration of Independence, 1776
11. King and queen of Serbia assassinated, 1903
12. City of New York incorporated, 1665
13. First Canadian Parliament opened in Ottawa, 1841
General Pershing arrived in Paris, 1917
14. United States Congress decided on a national flag, 1777
Hawaii organized as a United States territory, 1900
15. Magna Charta signed on this day, 1215
Arkansas admitted to the Union, 1836
Great Britain and United States signed Oregon Treaty, 1846
William II became emperor of Germany, 1888
Boy Scouts of America incorporated, 1916
16. Santiago, Cuba, bombarded, in Spanish-American War, 1898
United States battleship used in Panama Canal for the first time, 1915
- Death of General Bramwell Booth, for years head of the Salvation Army, 1929.
17. Battle of Bunker Hill, 1775
Corner stone of Bunker Hill Monument laid, 1825
18. United States declared war on Great Britain, 1812
Battle of Waterloo, 1815
19. Albany Convention met, 1754
West Virginia admitted to the Union, 1863
Statue of Liberty received from France, 1885
20. Lord Baltimore granted charter to Maryland, 1632
English prisoners perished in Black Hole of Calcutta, 1756
Accession of Queen Victoria, 1837
Presidential proclamation announcing purchase of Alaska, 1867
Ferdinand I of Rumania died, 1927
22. Abdication of Napoleon, 1815
Haakon VII crowned king of Norway, 1906
George V crowned king of Great Britain, 1911
24. John and Sebastian Cabot found the shores of North America, 1497
King Philip's War began, 1675
25. George A. Custer killed by the Indians in battle, and his command annihilated, 1876
26. English Corn Laws repealed, 1846
27. First telegraph message passed between New York and Boston, 1847
28. Coronation of Queen Victoria, 1838
Archduke Francis Ferdinand and wife assassinated, 1914
29. Parliament authorized Canada to establish new provinces, 1871
30. Treaty of peace between United States and Algiers, 1815
Indian Territory set aside for Indians, 1834

For Study

Battle of Bunker Hill
Dew
Egg
Flower
Nathan Hale
George V
Corn Laws
Indian Territory
Balloon
Bunker Hill

Home Sweet Home
Jack-in-the-Pulpit
June Bug
Martin
Navigation Acts
Lord Baltimore
Television
Magna Charta
Robin
John J. Pershing

Nest
Rose
Sandpiper
Harriet Beecher Stowe
Queen Victoria
Black Hole of Calcutta
John Cabot
Woman Suffrage
Alaska Purchase

QUOTATIONS FOR JUNE

1. Then let us, one and all, be contented with our lot;
The June is here this morning, and the sun is shining hot;
Oh! let us fill our hearts up with the glory of the day,
And banish ev'ry doubt and care and sorrow far away.
Riley.
2. A noise like of a hidden brook
In the leafy month of June,
That to the sleeping woods all night
Singeth a quiet tune.
Coleridge.
3. It's surely summer, for there's a swallow:
Come one swallow, his mate will follow,
The bird race quicken and wheel and thicken.
C. G. Rossetti.
4. All green and fair the Summer lies,
Just budded from the bud of Spring.
Coolidge.
5. Oh, my love's like a red, red rose,
That's newly sprung in June.
Burns.
6. O summer day beside the joyous sea!
O summer day so wonderful and white!
Longfellow.
7. Then came the jolly sommer, being dight
In a thin silken cassock, coloured Greene.
Spenser.
8. We bring roses, beautiful fresh roses,
Dewy as the morning and colored like the dawn.
Read.
9. We sit in the warm shade and feel right well
How the sap creeps up and the blossoms swell;
We may shut our eyes, but we cannot help knowing
That skies are clear and grass is growing.
Lowell.
10. Oh, for boyhood's time of June,
Crowding years in one brief moon.
Whittier.
11. There through the long, long summer hours
The golden light should lie,
And thick young herbs and groups of flowers
Stand in their beauty by.
Bryant.
12. Yon rosebuds in the morning dew,
How pure among the leaves sae green!
Burns.
13. From all the misty morning air, there comes a summer sound,
A murmur as of waters from skies, and trees, and ground.
Gilder.
14. (Flag Day)—
Hats off!
Along the streets there comes
A blare of bugles, a ruffle of drums;
A flash of color beneath the sky;
Hats off!
The flag is passing by!
Bennett.
15. No price is set on the lavish summer;
June may be had by the poorest comer.
Lowell.
16. The idle butterfly
Should rest him there, and there be heard
The housewife bee and humming bird.
Bryant.
17. It is the month of June,
The month of leaves and roses.
Willis.
18. Gather ye rosebuds while ye may,
Old Time is still a-flying,
And this same flower that smiles to-day
To-morrow will be dying.
Herrick.
19. Flowery June,
When brooks send up a cheerful tune,
And groves a joyous sound.
Bryant.
20. Before green apples blush,
Before green nuts embrown,
Why, one day in the country
Is worth a month in town.
C. G. Rossetti.
21. And the stately lilies stand
Fair in the silvery light,
Like saintly vestals, pale in prayer.
Dorr.
22. And every time a June day dies
We sigh, "Comes ever such a day again?"
Carr.
23. O beautiful, royal Rose,
O Rose, so fair and sweet!
Queen of the garden art thou!
Dorr.
24. The lily has an air,
And the snowdrop a grace,
And the sweet pea a way,
And the heart's-case a face—
Yet there's nothing like the rose
When she blows.
Rossetti.
25. The flowers are Nature's poems,
In blue and red and gold;
With every change from bud to bloom,
Sweet fantasies unfold.
Unknown.
26. The grass so little has to do—
A spear of simple green,
With only butterflies to brood
And bees to entertain,
And stir all day to pretty tunes
The breezes fetch along
And hold the sunshine in its lap,
And bow to everything.
Dickinson.
27. Now simmer blinks on flowery braes,
And o'er the crystal streamlet plays.
Burns.
28. What would the rose with all her pride be worth,
Were there no sun to call her brightness forth?
Moore.
29. And what is so rare as a day in June?
Then, if ever, come perfect days;
Then Heaven tries earth if it be in tune,
And over it softly her warm ear lays;
Whether we look or whether we listen,
We hear life murmur, we see it glisten.
Lowell.
30. June falls asleep upon her bier of flowers;
In vain are dewdrops sprinkled o'er her,
In vain would fond winds fan her back to life;
Her hours are numbered on the floral dial.
Larcom.



JUNGFRAU IN THE BACKGROUND

Typical Swiss scenery, with a beautiful valley hemmed in by towering peaks.

ground, in meadows, gardens, and fields. The larvae (young) are large white grubs with brown heads, which burrow down into the soil in the fall and stay there for two years or more. During their underground existence, the grubs feed on the roots and tubers of strawberries, grains, grasses, and vegetables, causing serious losses to farm crops. Deep fall plowing will kill many of the grubs, or expose them to frost and insect-eating birds. There is no effective remedy against the beetles. See BEETLE. W.J.S.

Classification. June bugs belong to the beetle family *Scarabaeidae*, and are related to the sacred scarabs of ancient Egypt (see SCARAB). Sixty or more species are found in the United States.

JUNE GRASS. See BLUE GRASS.

JUNGFRAU, *yoong' frou*, a mountain in Switzerland in the Bernese Alps, twelve miles south of the village of Interlaken. The Jungfrau, whose name means *maiden*, or *virgin mountain*, is regarded by a great many travelers as the most beautiful mountain of the Swiss Alps. Steep and majestic, and crowned with snow, it rises 13,670 feet above the sea. The ascent of this peak was first made in 1811 by two Swiss brothers; later, several other daring climbers reached the top by different routes. Any traveler can now easily, and with entire comfort, reach its summit. An electric railroad has been constructed which carries passengers over 11,000 feet up the slopes, the remainder of the trip being accomplished by means of elevators. See ALPS.

JUNGLE BOOKS. See reference in article BEAR; KIPLING, RUDYARD; ASIA (Animal Life).

JUNGLE FOWL, the name of a group of birds native to Southern Asia and the East Indies, from which the ordinary domestic fowls have descended. It is supposed that they were first domesticated in the Malay Peninsula. The original home of these birds was the jungle, a term derived from *jangala*, a Sanskrit word meaning *tangled wilderness*, or *thicket*. The wild birds, which are common in India, run with great speed, fly rather high, and roost in trees. The hen cackles in much the same manner as our domestic fowls, but the cock crows like a bantam rooster. The nest is a simple depression in the ground. See MOUND BIRD. D.L.

Classification. Jungle fowls belong to the family *Phasianidae*. Four species are known, placed in the genus *Gallus*.

JUNIOR COLLEGES. See SCHOOL (Public Schools).

JUNIOR HIGH-SCHOOL MOVEMENT. It comes as a surprise to most people to learn that the school system of the United States developed without a plan. In the early colonial days, there was a frank imitation of European practice, which sharply separated the elementary schools, those for the common people, from the secondary schools, those organized for the favored classes who were destined for the professions or for "dignified leisure." In America, because of the spirit of democracy and also because of the necessity for

economy, a continuance of this plan was impossible. Instead of maintaining parallel schools, as in Europe, American communities very early established elementary schools, continuing for seven, eight, or nine years, and followed these with the secondary school that adopted a standardized course four years in length.

In various parts of the country there were many variations in types of schools. The ambition of the people to provide through education an opportunity for every child resulted in the provision of what could be afforded and of what seemed to suit the needs of the various communities. But nowhere in the history of American education do we find record of a comprehensive consideration of what the best organization should be. Following the elementary school, which gradually became standardized at seven years in the Southern states and at eight in the rest of the country, there were tried several types of secondary schools.

First, there were the Latin grammar schools, frank imitations of those in Europe. Then about the middle of the eighteenth century came academies, which encouraged the attendance of girls and attempted to offer subjects more suitable to life in America. The academy was partly successful, but gradually became formal, and offered for the most part work very similar to that of its predecessor. Near the end of the nineteenth century, the high school began to develop with marked rapidity. In each decade it doubled the number of pupils enrolled, until now there are more than 4,000,000 boys and girls pursuing studies beyond the elementary grades. The proportion of pupils in the secondary schools of the United States is many times greater than that in any other country in the world at any time in its history. The attempt to give every child an opportunity to make the best of himself is a remarkable manifestation of the spirit of democracy.

About 1890 there were many criticisms of the educational program. The famous Committee of Ten of the National Education Association, after a careful study, pointed out what it considered the waste in continuing elementary schooling too long, with the result that young people were longer delayed than in Europe in entering upon their professional studies. It recommended the shortening of elementary education to six years. Though generally commended, the report had little immediate effect. The country was too busily engaged in providing schools of any kind for the rapidly increasing number of pupils that sought their opportunities.

About 1910, however, the long discussion began to bear actual fruit, and there were established the first junior high schools. They

were the result not only of the argument that secondary education should begin earlier, but also of the recognition of a number of other factors. One was that the elementary schools had gradually been improved so that they could reasonably be expected to accomplish in six years what they had previously done in seven, eight, or nine. They were graded, better housed, and largely supervised, were taught by teachers with more professional training, and had improved textbooks and other equipment. Moreover, educators realized that many conditions in America were greatly changed, and that a consequent change was necessary in school organization to provide adequately for the appropriate education of each individual child. It was obvious that many pupils were continuing into the high schools and there studying traditional subjects which were not suitable to their abilities and future needs. For these and other reasons, junior high schools were established.

The arguments for a new type of school intermediate between the elementary grades and the high school were numerous and convincing. They caught the imagination of schoolmen and the public alike, and as progress had by 1910-1915 made it possible, junior high schools were rapidly established. At first, naturally, there were no standards. Some of the new schools consisted only of the seventh and eighth grades, but most of them included the ninth grade. Now these three intermediate grades are generally considered the field of the junior high school. A number of cities rushed hastily into a reorganization of their school systems, apparently without a thorough understanding of their purposes, and certainly without adequate preparation. Other cities, like Rochester (New York), spent a year or more preparing, and became leaders in the movement. Others still, like Cincinnati, Saint Louis, and Philadelphia, organized single schools for experiment. The theory of the junior high school is now generally accepted as sound.

What are the purposes of the junior high school? From the administrative point of view, it has been argued that it will retain pupils longer in school, result in an economy of time, provide conditions for better teaching, permit of more socializing opportunities, and thus improve the discipline, relieve the building situation, and effect sound financial economy. These purposes are all desirable, but the true reasons for the new type of organization are more truly educational. To understand these, one must know three great changes that have come in educational psychology and philosophy.

The first of these is that the old doctrines of "transfer" and "discipline" are now thoroughly

discredited. Not so many years ago, everybody believed that the mind was composed of "faculties" of memory, imagination, will, and the like, and that any kind of rigorous training would automatically transfer to the strengthening of all of these faculties. We know now that this is not true. The mind is made up of numerous, almost innumerable, connections, each one almost as specific as in a telephone system. The best and most economical way of learning, therefore, is of specific things that will most probably be needed in life. It is doubtless easier to learn French after four years of learning; but if French is what is desired, the whole time available would better be applied to that language. (This statement is not intended to discredit the values in Latin; it concerns only the economy of transfer.)

Similarly, a few years ago most people believed that there was great value in the "discipline" of studying what was merely difficult, distasteful, and otherwise useless. We now recognize that the results of this theory were bad far more often than good. Work should be hard, of course, hard enough to challenge the best effort with resultant success; but it should be applied to what is assuredly useful, and it should result in attitudes that will insure a continuance after school of similar effort in the same direction.

A second change in psychology has resulted from a recognition of individual differences. It is now universally recognized that children vary in their inherited abilities, capacities, and aptitudes, and that these differences are increased by environment. Some of these must be leveled: all normal children must learn to read, write, and perform the simple operations of arithmetic; all must learn the conventions of good manners and the elementary principles of government. But it is now recognized that beyond elementary education, differences should be recognized and emphasized. Schools in the past never succeeded in making all people alike—fortunately. As they cannot and should not, schools should find what each person is good for, and train him to live his own life better than he otherwise could.

Philosophy has recently emphasized that education must embrace much besides academic studies. It now is recognized as including social responsibilities and duties, especially, and also the attitudes that are developed toward all phases of life. In the formative period, especially during early adolescence, these matters are of great importance. Consequently, it is argued, pupils between the ages of twelve and sixteen are best educated apart from those younger and from those older.

The peculiar educational functions of the junior high school have been formulated as follows:

First, to continue in so far as it may seem wise and possible, and in a gradually diminishing degree, common, integrating education;

Second, to ascertain and reasonably to satisfy pupils' important immediate and assured future needs;

Third, to explore, by means of material in itself worth while, the interests, aptitudes, and capacities of pupils;

Fourth, to reveal to them, by material otherwise justifiable, the possibilities in the major fields of learning;

Fifth, to start each pupil on the career which, as a result of the exploratory courses, he, his parents, and the school are convinced is most likely to be of profit to him and to the state.

The importance of these functions may easily be overlooked unless the statements are read with the greatest care. Every phrase conveys a meaning that suggests great possibilities of change in present practice, changes which almost everyone admits as highly desirable. Through the junior high school, these are much more easily possible than through any other type of organization that has been proposed. It cannot be doubted that the new schools have contributed largely to the progress of American education, or that they still have much work to do.

Junior high schools have already caused many changes in the work of the elementary grades and in that of the senior high school. These changes are not yet complete. They make necessary an entire recasting of the work of the elementary schools, for they must plan to give in six years most of that education which it is essential that everybody shall possess. If the work of the junior high schools is well done, it will greatly simplify the problems of higher education, sending the pupils forward with some knowledge of the opportunities ahead of them and already somewhat classified as to the kinds of studies that they can pursue with most profit. This will increasingly enable the senior high schools to improve their work. If only pupils who have proved their fitness to study such branches as higher mathematics and foreign languages could elect them, progress would be faster, and other economies would assuredly result.

As the theory of the junior high school has been generally accepted, the reorganization is well under way all over the United States. Because there is no generally applied standard, and because no central organization has collected complete data, it is impossible to say just how many junior high schools there are. Nearly all of the large cities, however, have committed themselves to the reorganization, and many of them already have all of their early adolescents housed in the new type of

school. Several states are in process of reorganizing all of their schools, small as well as large, on the new plan; and the great standardizing agencies, such as the North Central Association of Colleges and Secondary Schools, have put their influence behind the movement.

The chief difficulties are found in small districts, where there are too few pupils to make possible any degree of differentiation. These schools can, however, and often do, incorporate many of the other desirable changes into their programs. Consolidation, with transportation of pupils, is in many communities solving this problem. As this type of school decreases in number, the difficulties of adjusting pupils who transfer from other districts differently organized also will decrease. It is safe to say that the United States is definitely committed to a school organization of an elementary school of six years, perhaps preceded by a kindergarten or some other form of pre-school, a junior high school of three years, and a senior high school of the same length. T.H.B.

JUNIOR RED CROSS. See RED CROSS.

JUNIOR REPUBLIC. See CHARACTER TRAINING (Unselfishness Is Fundamental).

JUNIPER, the common name of a genus of evergreen trees and shrubs that are widely distributed in the northern hemisphere except

and is widespread in Asia and Europe. Although it occurs most frequently as a shrub two to six feet tall, in Southern Illinois it is treelike in size, attaining a height of twenty-five feet or more. It has bark of a deep chocolate-brown tinged with red, and its narrow, sharp-pointed leaves are chalky white on the upper side, but dark yellowish-green and shining below. The round, bluish-black fruits require two years to ripen. They are much in demand as flavoring for gin, owing their flavor and certain medicinal properties to an essential oil. The hard, fragrant wood is yellowish-red with brown heartwood. Taken from plants of sufficient size, it is valued in turnery and for veneers.

The *red cedar*, or *savin*, is another North American species of juniper. Like the foregoing, it is widely distributed and can adapt itself to many kinds of soil and conditions. The beautiful red heartwood of this tree is extensively used in making lead pencils and furniture, and it is also the wood employed in making cedar chests for storing garments. Because the wood resists decay while under the ground, it is in great demand for fence posts. The red cedar sometimes grows to a height of 100 feet in the swamps and rich bottom lands of the Southern and Southwestern United States. G.M.S.

Scientific Names. The junipers belong to the family *Pinaceae*. The common juniper is *Juniperus communis*; the red cedar is *J. virginiana*.

JUNIPERO SERRA. See CALIFORNIA (California's Old Missions).

JUNIUS, *joon' yus*, **LETTERS**, a series of letters, seventy in all, signed "Junius," which appeared in the London *Public Advertiser*, between 1769 and 1772, and caused a furor in English politics. In them the author boldly denounced the inefficiency of several leading members of the Ministry. The *Address to the King*, published December 19, 1769, was the letter which caused the greatest sensation. In it the king was reminded of the fate of Charles I. Henry S. Woodfall, the printer and publisher of the letters, was prosecuted, but was acquitted. "Junius" made so many enemies that he never found it safe to reveal his identity. The letters have been ascribed to Burke, Lord Shelburne, Colonel Barré, Wilkes, Lord George Sackville, and several others, but it is the general opinion that Sir Philip Francis was the author. The circumstances surrounding the position of "Junius" correspond with the history of Francis, and the handwriting of "Junius" is very similar to that of Francis, although experts differ in their opinions on this point.

JUNKERS, a term given to the younger landed gentry of Prussia, prior to the World War. In the nineteenth century, *Junkerthum* was a term of reproach, referring to the party



THE JUNIPER

The tree, detail of a branch, and fruit. The latter is shown about natural size.

in the tropics. Junipers belong to the pine family, but have one distinctive characteristic. Their fruit is a cone, but, unlike the typical scaly cone seen on pines, firs, and other cone-bearers, it is a rounded, juicy structure very much like a berry, in color ranging from blue to red. Two types of leaves are borne on junipers, those that are best described as awl-shaped, and those known as scale-shaped.

The *common juniper* is said to be more widely distributed than any other tree of the northern hemisphere. In North America it has a range from the Arctic Circle to Mexico,

of reaction in Prussia, because its supporters were principally found among the Junkers. See **WORLD WAR** (Causes: A General Survey).

JUNO, the chief Roman goddess of classical mythology, the Hera of the Greek myths. She was regarded as queen of the gods and of heaven, and was also the especial genius of the female sex, worshiped by women as their protectress in all that concerned marriage and the birth of children. She was represented as the jealous and exacting wife of Jupiter, and her life was not a very happy one. She spent a great deal of time in planning punishments for Jupiter's mortal wives or their sons. She was supposed to be a very beautiful, matronly woman. In works of art, Juno is sometimes represented as drawn through the air by a pair of sacred peacocks harnessed to her chariot. The goose and the cuckoo were also sacred to her.



STATUE OF JUNO

Found in the Villa Farnese, in Rome.

Related Subjects. For some of the myths connected with Juno, the reader is referred to the following articles:

Jupiter	Troy
Mythology	Vulcan
Semele	

JUNTA, signifying *assembly*, is a name given in Spain and Spanish-American countries to a body of persons combined for political or administrative purposes, whether summoned by the king or President, or simply called together on their own accord as representatives of the people. The Whig Junta of England was an organization of the chiefs of that party in the reigns of William III and Anne. The interior committee of the Privy Council under Charles I, which was the beginning of the modern Cabinet, was contemptuously called the *Juncto* by the Earl of Clarendon. Benjamin Franklin organized a debating society called the Junta which, in 1743, developed into the American Philosophical Society. See **CABINET**.

JUPITER, the Roman mythological name for the king of heaven, whom the Greeks called Zeus. Having by strength and cleverness

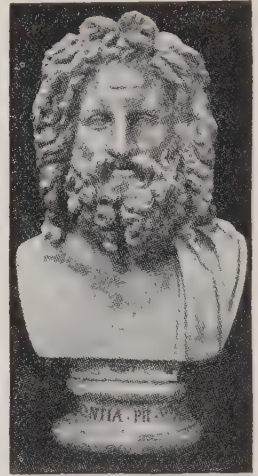
brought about the overthrow of his father, Saturn, he divided the world with his two brothers, giving to Pluto the underworld, to Neptune the sea, and reserving for himself the sky, with supreme sovereignty over gods and men. He married first the goddess of wisdom, Metis, but, becoming alarmed by a prophecy that his first child should be wiser than its father, he swallowed his wife. This precaution proved vain, however, for shortly afterward there sprang from his head, full grown and fully armed, the goddess Minerva, whose name became a synonym for wisdom of the highest kind.

As his wife, and the queen of heaven, Jupiter selected Juno, but her jealousy and dignity irked him at times, and he solaced himself with many other wives, both among the goddesses and among mortals. To him were born many children, of whom the most famous were Apollo and Diana, Mercury, Mars, Hebe, the Fates, and the Muses.

Greek artists represented this greatest of their gods as a bearded man of middle age, handsome and majestic and generally benignant. Beside him perched the eagle, his strong-winged messenger, and in his hands were grasped the thunderbolts with which he punished gods and men.

Related Subjects. The reader is referred in these volumes to the article **MYTHOLOGY** and the mythological characters named above. See, also, illustration under **IVORY**.

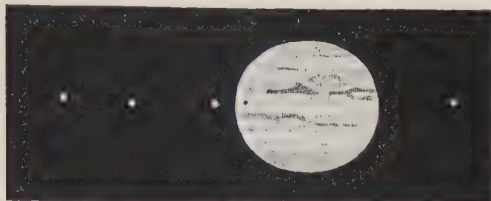
JUPITER, the "giant planet," is the largest of the planets and the fifth in their order from the sun. Next to the sun, it is the largest body in the solar system. Its mean diameter, 86,700 miles, is approximately eleven times that of the earth. Jupiter is not a perfect sphere; its diameter measures 82,900 miles from pole to pole, and 88,600 miles at the equator. Its surface is 120 times, and its volume 1,300 times, that of the earth. Its density, however, is less than one-fourth that



JUPITER

This is one of the best of the numerous heads of Jupiter that have survived the centuries; it was once supposed to be a faithful reproduction of the Zeus of Olympia carved by Phidias. The bust is of Carrara marble, and was found during excavations made in the eighteenth century. Only the face is ancient; a part of the forehead, the point of the nose, the lower part of the hair, and the breast are restored parts. It is now in the Vatican Museum.

of the earth. So, while it would take more than 1,300 earths to fill the space occupied by Jupiter, it would take only 317 earths to equal it in mass. A man weighing 150 pounds on the earth would weigh about 400 pounds on



JUPITER AND ITS SATELLITES

Jupiter, but if Jupiter were as dense as the earth, the man would weigh about 1,500 pounds. Jupiter's average distance from the sun is 483,000,000 miles, over five times that of the earth. To the earth, Jupiter may come as close as 367,000,000 miles or recede as far as 600,000,000 miles.

Jupiter is easily recognized, since it is, next to Venus, the brightest planet, and sometimes it rivals that planet in brilliance. When seen through an opera glass or a small telescope, it appears slightly flattened, owing to the difference between its polar and equatorial diameters. When seen through a large telescope, the planet presents a beautiful appearance. The disk is marked with belts of different colors which run parallel to the equator. The center of the disk is brighter than the edge. In 1878 a great red spot, 30,000 miles long and 7,000 miles wide, was noticed, and, until recently, this was a prominent feature, but is now scarcely visible.

Jupiter turns upon its axis once in nine hours and fifty-five minutes, so its day is less than one-half of our day. Its year, however, is nearly twelve of our years. Since its axis is but slightly inclined to the plane of its orbit, change of season on Jupiter must be slight (see SEASONS).

The actual surface of Jupiter is hidden by clouds of gas in violent motion. Recent measurements by the United States Bureau of Standards indicate that these clouds have a temperature of about 225° below zero, Fahrenheit.

Satellites. Jupiter is accompanied by nine moons, four of which were discovered by Galileo in 1610. They were the first heavenly bodies discovered by aid of a telescope. Recent investigations show that these four satellites always keep the same face toward Jupiter, as does the earth's moon, and rotate once on their axes in the same time that it takes them to revolve around their primary. The fifth satellite was discovered by E. E. Barnard of the Lick Observatory, in 1892, and a sixth and seventh were discovered in 1904 and 1905

by C. D. Perrine of the same institution. The eighth satellite was discovered in 1908, and the ninth in 1914. The eighth and ninth have the peculiarity of revolving around the planet in the opposite direction from the others. Roemer made his great discovery of the velocity of light, in 1675, by observation of the eclipses of the satellites of Jupiter. See LIGHT. F.B.L.

Related Subjects. See PLANET, for comparative sizes of the planets and distances from the sun; and SUN, for comparative sizes of the sun and the planets.

JUPITER AMMON, TEMPLE OF. See OASIS.

JURA, *joo'rah*, a mountain range extending from northeast to southwest along the borders of Switzerland and France, forming a high plateau between the Rhine and the Rhone rivers. The German Jura begins at the Rhine and extends about 300 miles to the Main valley. South of the Rhone, where the chain is known as the Jura Alps, the mountains merge with other branches of the great Alps range. Along the lower elevations, several beautiful lakes are formed, the largest being Lake Geneva, a famous resort. The highest peaks are Reculet and Crête de la Neige, both over 5,600 feet in altitude.

Mineral products are comparatively scarce, although iron, copper, and salt are mined in fair quantities. Marble, alabaster, and granite are quarried, and the valuable timber is a source of profit. Lausanne, a beautiful city, lies on the southern slope of the mountains. The two chief rivers having their source in the chain are the Doubs and the Ain. See SWITZERLAND (Physical Features).

JURASSIC, *joo ras'ik*, **PERIOD**, the second of the periods comprised in the Mesozoic Era, succeeding the Triassic Period and succeeded by the Cretaceous. The stratified rocks deposited during the period constitute the *Jurassic System*, which was so named because the rocks are well displayed in the Jura Mountains, which lie between France and Switzerland. The system is well represented in Western North America and in Western and Central Europe. The end of the Jurassic Period was marked in some parts of the world by mountain-building disturbances, particularly in California, where the formation of the Klamath and the Sierra Nevada mountains began at that time.

L.LaF.

Related Subjects. The reader is referred in these volumes to the following articles:

Cretaceous Period	Mesozoic Era
Geology (Divisions of	Triassic Period
Geologic Time)	

JURISPRUDENCE, the science of law. See LAW, and topics indexed therewith.

JURY AND TRIAL BY JURY. Trial by jury is an institution prominent in the history of Anglo-Saxon resistance to oppression. The

principle that a freeman cannot be deprived of liberty or property except by the "lawful judgment of his peers [equals]" was stated in the Magna Charta, 1215. The English uprisings against the Stuart kings and American rebellion against George III were partly in opposition to unjust prosecutions by the Crown, abuses against which the *grand jury* in particular is a defense.

Grand Jury. This is probably a development of an Anglo-Saxon custom by which the twelve senior thanes decided whether accused men should submit to the Trial by Ordeal or Combat, or be freed. In principle this old institution agrees with the modern grand jury, of from twelve to twenty-three men, who determine whether there is sufficient evidence against an accused man to justify a trial. They do not hear the defendant's story, but if twelve jurors believe that the accusations are possibly correct, they call them a *true bill*, and he is indicted. As in Saxon days, the jurors may rely on their own knowledge as well as that of witnesses. In British jurisdictions, many consider that the grand jury has outlived its usefulness, and in some of the states of the American Union it is employed only in emergencies. The grand jury is impaneled by a judge, to whom it reports on all cases heard by it.

Petit, or Petty, Jury. This, the common jury, decides from the evidence presented at a trial what are the facts. In a criminal case it renders a verdict, *guilty*, *not guilty*, or, as in Scotland, *not proven*. In civil cases it may fix the amount of damages. The petit jury consists of twelve persons.

The Norman conquerors of England, to gain information necessary to the Crown (including probably that contained in the Domesday Book), summoned the men of a neighborhood to testify. From this custom, apparently, the jury developed. It was at first confined to land disputes. The twelve men thought most familiar with the question were summoned; if their opinion differed, more were called, until twelve voted together. The jurymen were thus witnesses as well, whereas, in modern practice, a man is considered an incompetent jurymen if he has knowledge of the facts. The number in a jury soon became fixed at twelve, who must agree on the verdict. If they failed, they could be carted to the edge of the county and thrown into the ditch. To-day, on the other hand, a jury must be uninfluenced in its conclusions and is confined in a room until it reaches its decision or is deadlocked. The unanimous vote is not required in some countries, and not always in England and America, nor is twelve always the number of members.

Though there is considerable opposition to the jury system, it still remains the best arm of the law. The principal objections are that

it is too slow. At each session of court, a number of men are chosen, in the manner prescribed by the law of the community; from these each jury is selected. Either side has a limited right to challenge and reject those it deems unfit, and in the United States this feature is carried to extremes not permitted elsewhere, with a consequent loss of time.

Coroner's Jury. This jury serves principally to inquire into the causes of unusual deaths. Like the grand jury, it may declare that a suspected person should be held for trial for murder. Six men compose it.

Related Subjects. The reader is referred in these volumes to the following articles:

Battle, Trial by	Judge
Coroner	Law
Courts	Magna Charta
Crime	Ordeal and Combat
Domesday Book	Procedure
Indictment	Thane

JUST AS I AM (hymn). See HYMNS AND HYMN TUNES.

JUSTICE (not Judge), the official title of a member of the Supreme Court of the United States (which see).

JUSTICE, DEPARTMENT OF, one of the executive departments of a government, although in some countries it is known by other names.

United States. When the Federal government was organized in 1789, Congress provided that there should be a Federal Attorney-General. He was given a salary of \$1,500 per year, and out of this sum was supposed to pay the salary of an assistant. His duties were limited to advising the President and representing the United States government before the Supreme Court. As these duties required but little of his time, the Attorney-General was not required to live in the capital city and was permitted to continue his private practice of the law. He was, from the first, by courtesy a member of the President's Cabinet, but at the same time was not at the head of an executive department, as were the other Cabinet members. See CABINET.

With the development of the country and the growing importance of the legal arm of the government, there was organized in 1870 the Department of Justice, on a basis similar to that of each of the other departments. The Attorney-General was placed at its head. The Department of Justice must not be confused with the *Judicial Department*; the latter is specifically the system of courts having jurisdiction over all cases in which the United States is a party; naturally, the Department of Justice has close connection with it.

The Department of Justice is charged with the general superintendency of the eighty-six United States district attorneys, and a like number of United States marshals, of all the judicial districts; it examines the titles of lands

needed for government purposes—for custom-houses, forts, dockyards, and the like—administers the bankruptcy laws; and conducts through its own office or through the various United States district attorneys the prosecution of offenders against the Federal laws.

The Attorney-General. The head of the Department of Justice and his associates are the legal advisers not only of the President, but also of the heads of the other executive departments. Legal opinions in writing may be demanded by any department head; from time to time these opinions are published, and they are regarded, next to court decisions, as authority on the points of law which they cover. The department head also makes an annual report to Congress of the business of his department, and may offer suggestions as to new legislation needed.

The Attorney-General is fourth in line among Cabinet members for succession to the Presidency. His salary is \$15,000 per year.

State Attorney-General. This official occupies a position in the state government similar to that of the Attorney-General of the United States in the national government. He conducts cases in the state supreme court to which the state is a party, and is the legal adviser of the governor and the heads of departments of the state government.

Canada. The Canadian Department of Justice has two representatives in the Ministry, the Minister of Justice (who is also Attorney-General) and the Solicitor-General. Besides the duties of giving legal advice to the Governor-General and the government, and of administering justice throughout Canada, this department has the very important task of examining all the laws passed in all the provinces, so that the Governor-General may know when to exercise his veto power. It also administers prisons and penitentiaries and the secret service. E.D.F.

JUSTICE OF THE PEACE, an officer of a township, endowed with judicial powers for the purpose of preventing breaches of the peace and bringing to punishment those who have violated minor laws. Under the constitution of some states, these officers are appointed by the executive; in others, they are elected by the people. The incumbent has judicial power only in certain petty civil cases. After arrest, a culprit is brought before the justice of the peace, and after hearing he is either discharged or held to bail to answer the complaint, or, for want of bail, is sent to jail. In some states where there are no criminal courts of record, the justice of the peace acts only as a committing magistrate to bind the accused over to the grand jury, and he has no trial jurisdiction. In large cities, police magistrates take the place of justices of the peace. Compensation is in fees.

JUSTINIAN I, *jus tin' ih an*, in full, FLAVIUS ANICIUS JUSTINIANUS (483-565), called THE GREAT, was a Roman emperor of the East, whose reign was the most brilliant in the history of the divided empire. He was born in the village of Tauresium in Illyricum. In 518 his uncle, a Thracian peasant, became emperor under the name Justin I, and in 527 gave his nephew a share in the imperial power. When Justin died, a few months later, Justinian was crowned sole emperor.

He restored to the Roman Empire a part of its former possessions by victories in Persia, Africa, and Italy, but began a labor of far greater importance when he turned his attention to the laws, and directed ten learned men to compile a new code. The result was the *Corpus Juris Civilis*, or *Body of Civil Law*. This and other legal works which the emperor caused to be published were the greatest contribution of the Roman intellect to the civilization of the world. Justinian is also famed as a builder, for he erected fortresses, harbors, monasteries, and the celebrated Church of Saint Sophia at Constantinople. To obtain money for these public improvements, he burdened the people with heavy taxes. He died in the thirty-eighth year of his reign, at the age of eighty-three.

JUTE, the cheapest of all known fibers, is used extensively in making gunny cloth and sacks. This fiber is the product of two closely related tropical

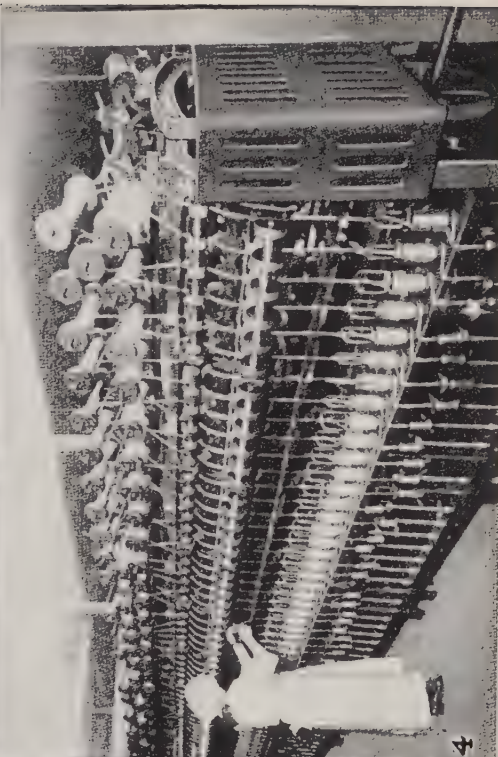
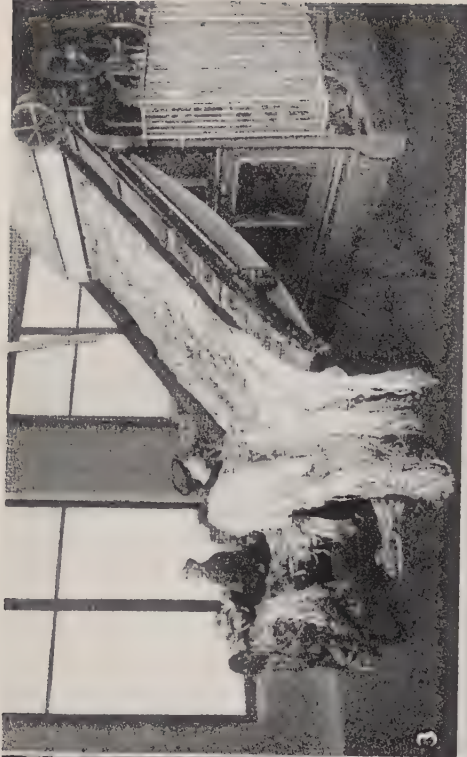
plants of the same family as the basswood. These plants grow in the warm, moist sections of Asia, all of the jute of commerce being produced in four provinces of Northeastern India. Seed is sown broadcast on soil that has been thoroughly tilled, and when the plants are about half a foot tall, the earth is

loosened with a rake and the plants thinned out. Two subsequent weedings are all that the growing plants require. The stalks grow to a height of seven to fourteen feet, and do not branch except near the top.

Between flowering and seed-ripening is the period of harvest, but the best fiber is obtained soon after the plants are in flower. The stalks, stripped of leaves and branches, are tied in bundles and immersed in water until the fiber



JUTE
Branch, leaves, and seed.



The Jute Industry. (1) Natives cutting the mature fiber plant. (2) Beating out the fiber; the scene is a retting pool. (3) Feeding the fiber into a carding machine. (4) Spinning frame, where the yarn is twisted into twine.

Photos: Columbia Rope Co.

is loosened by the rotting of the outer bark. This process, called *retting*, takes from ten to twenty days. The stalks are then beaten, to free the fiber from the bark, and the fiber is cleaned and dried. That which is designed for exportation is pressed into bales weighing 400 pounds.

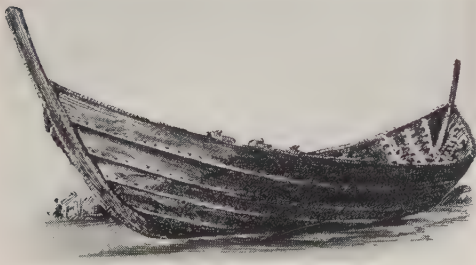
Jute fiber is long, soft, and lustrous, and can easily be spun into coarse threads. It is, however, weaker than hemp, does not bleach well, and when exposed to dampness, it loses in strength. One of the largest uses of jute in the United States is as bagging, or wrapping for cotton bales. Aside from its use in the manufacture of gunny cloth, it is employed in the making of coarse curtains, chair coverings, and other upholstery fabrics, carpets, and burlap; the finest threads are sometimes employed in making imitation silk fabrics. The fiber is also made into fine and coarse twines, small ropes, sash cords, and other forms of cordage. Jute butts, the short ends of the stalks, and the rough fibers rejected in the preparation of the fiber are used extensively in paper-making.

Jute is imported into the United States both as raw material and in manufactured form.

B.M.D.

Scientific Names. The two species of jute are known as *Corchorus capsularis* and *C. olitorius*. The former is the more widely cultivated because it has the better fiber. The species belong to the family *Tiliaceae*.

JUTES, a Teutonic tribe from Denmark which assisted the Angles and Saxons in their conquest of England in the fifth century.



BOAT OF THE ANCIENT JUTES

Fairly well preserved, in a Danish museum.

According to the *Anglo-Saxon Chronicle*, the first piratical band that landed on the island (A.D. 449) was a company of Jutes led by Hengist and Horsa. The three tribes took possession of most of the country except the western portion, now called Wales, into which the remnant of the British population was forced to retire. The name of the Jutes is still preserved in the peninsula of Jutland, North-east Denmark. See **ANGLO-SAXONS; ENGLAND (History)**.

C.W.

JUTLAND. See **DENMARK (Physical Features)**.

JUTLAND, BATTLE OF. See **WORLD WAR (War on the Sea)**.

JUVENAL, DECIMUS JUNIUS JUVENALIS, a famous Roman poet and satirist, who lived about A.D. 60 to about 138. He was an accomplished speaker during the first half of his life. After the accession of Trajan to the throne, in 98, he began to write satires in which he described the conditions of life at Rome with extraordinary force. His first nine poems express in powerful terms his violent indignation, aroused by the corrupt Roman life that he knew; the remaining seven are moral essays. Gifford and Dryden have translated some of his satires, and Johnson has imitated two of them in his *London* and the *Vanity of Human Wishes*. The following are examples of his thought and style:

Every vice has reached its zenith.

There is wonderful unanimity among the dissolute.
No one ever reached the climax of vice at one leap.

JUVENILE, ju' ve nil, COURT, a special court in the judicial system for the trial of cases involving children who have committed crimes or misdemeanors, or otherwise conducted themselves in a manner contrary to the public standards of propriety. The juvenile court is the logical outcome of modern methods of dealing with youthful transgressors of the law. It is not so many years ago that a child of thirteen or fourteen, who stole a loaf of bread because he was hungry, would be given a jail sentence. During his term of confinement, he would be in constant association with grown men, many of them experts in crime—murderers, thieves, forgers, wife-beaters, swindlers, and petty criminals of all kinds. The prison system up to the middle of the nineteenth century threw no protecting influences around the juvenile delinquent.

Society to-day recognizes that its former methods were wrong. It recognizes the fact that children are seldom instinctively criminals, but that they usually violate the law as the result of bad example. The boy who plays baseball in a city street is technically a violator of the law, and he has sometimes been arrested for his fault; but to-day, even when the offense is a more serious one, there is a growing tendency to interpret the offense from the child's viewpoint. If the child is actually at fault, it is the duty of society to prevent a repetition of the offense and, if possible, remove the cause. To do this it is necessary to keep the child from association with criminals and, so far as possible, from the atmosphere which suggests crime.

[To-day's views with respect to *juvenile delinquency* are discussed in these volumes in an article under that title; to it the attention of the reader is directed.]

The First Juvenile Courts. Various people and various countries have claimed the credit for establishing the first juvenile court, but the fact is that the institution is the result of gradual growth. The first step was taken by Massachusetts in 1869, in the form of a probation law, but the statute was not strictly enforced. The idea of separate courts for children was first adopted in Adelaide, South Australia, in 1898, and in Toronto, Ont., later in the same year. In the next year, 1899, the first juvenile court in the United States was established in Chicago. This court was not then and is not now a separate organization, but a division of the circuit court. Denver has a juvenile court which was established in 1899 as a separate institution. Through the personality of its judge, Benjamin B. Lindsey (which see), this court became, perhaps, the most famous juvenile court in the world.

In 1903 the Denver court announced its right, under what is known as its chancery-court powers, to appoint a woman as a sort of referee to sit with the judge in the trial of cases affecting girls. In 1909 the Colorado legislature passed the first statute law confirming this practice. In 1913, in the absence of any such statute law, but under chancery powers similar to those used by the Denver court, the Chicago court appointed a woman, with the title of assistant judge, to hear cases of girls. In 1926 Chicago elected a woman (Miss Mary Bartelme) as one of its county judges, and juvenile cases were assigned to her. From Denver and Chicago the idea of the juvenile court spread rapidly, even to England and other European countries, but it is generally recognized as a distinctly American contribution to social progress.

JUVENILE CRIME. See MENTAL CONFLICT; JUVENILE DELINQUENCY.

JUVENILE DELINQUENCY, CAUSES AND MODERN METHODS OF TREATMENT. Juvenile delinquency has frequently been defined as the commission by a child under a certain statutory age of an offense which, if committed by a person over that age, would constitute a crime under the provisions of law. This definition, however, is not sufficiently broad to cover all phases of juvenile delinquency, for the term actually includes not only the commission of certain forbidden acts, but also any general action or behavior on the part of a child which tends to endanger his physical or moral well-being.

In the *Standard Juvenile Court Law*, prepared by a committee of juvenile-court judges appointed through the National Probation Association to suggest a model juvenile-court act, a delinquent child is defined as—

(1) A child who has violated any law of the state or any ordinance or regulation of a subdivision of the state;

(2) A child who by reason of being wayward or habitually disobedient is uncontrolled by his parent, guardian, or custodian;

(3) A child who is habitually truant from school or home;

(4) A child who habitually so deports himself as to injure or endanger the morals or health of himself or others.

In many states, however, a delinquent child has been differently defined, some laws favoring a shorter classification and some a more extensive one. In New York state, for example, its children's-court act follows more or less closely the definitions set forth in the *Standard Juvenile Court Law*, but, in addition, classifies as delinquent a child who associates with immoral or vicious persons, or who frequents places forbidden by law, or who begs or solicits money in public places, or who engages in forbidden or illegal occupations.

There are a number of differences also in the provisions of law in the various states relating to the age limit of delinquent children. In some states, offenders can only be considered to be "delinquent children" up to their sixteenth birthday, and after that time, any possible conflict with the law is considered to be a crime. In others, they are regarded as delinquent children up to their twenty-first birthday. The most generally accepted age limit, however, governing the original jurisdiction of the juvenile court, is eighteen, and in most localities children cannot be treated as juvenile delinquents after passing their eighteenth birthday.

Causes. The causes of juvenile delinquency are manifold, and it is obviously impossible in dealing with so complex a subject to set forth any comprehensive classification of the causative factors leading to its occurrence. For example, throughout all ages sociologists and philosophers have debated the relative importance of environment and heredity as the chief contributory causes of anti-social conduct, but even at the present time, the question still remains more or less an open one.

Coming down, however, to modern conditions, it is comparatively easy to note a number of elements which enter into the subject of juvenile delinquency as we know it to-day. Among others might be mentioned the unrest of the times, especially since the upheavals caused by the war; the effect of broken homes; the lack of parental supervision and responsibility; the lack of understanding between modern parents and their children; the absence of religious training in so many families; the passing of the real home, where children could bring their friends instead of meeting them at dance halls, poolrooms, or on the streets; too much or too little spending money for children; the wanderlust tendency in boys; the craving for amusement which is not given a proper

outlet; the lure of moving pictures; the lack of adequate playgrounds and recreational facilities; the influences of modern inventions, particularly the automobile, with its infinite capacity as a source of pleasure and its adaptability as a means of escape after the commission of an offense.

Of course, these various modern elements and conditions do not affect alike all classes of juvenile delinquents. Some contribute to all forms of delinquency; some may be regarded as the direct causes which lead the very young into misconduct and anti-social disorders; while others work especial injury and harm among the older delinquents, from fifteen to eighteen years of age. It is very gratifying, however, to discover from the statistics of the American juvenile courts that juvenile delinquency is not increasing throughout the country, and that modern conditions, while bringing in their train new problems to be faced, have also brought new remedies for the cure of delinquency which seem to be reducing the number of cases brought before the courts for treatment. The truth is that every age and era have their own especial problems engendered by the conditions of the times, and that the modern causes of juvenile delinquency, while they may appear disquieting on the surface because of their novel and perplexing features, are no worse than those which had to be faced in bygone days.

It is never easy to say just why certain children depart from normal standards and go wrong, nor can the reasons be analyzed with precise accuracy; but it is safe to say that some form of maladjustment underlies every case of delinquency, while maladjustment in its turn can be traced in practically every instance to the effect of two chief causes—environment or personal defect. Using the term *environment* in its very broadest sense, by which is meant the influence of the home, of the neighborhood, and of companionship in general, it is usually found to be the direct cause for a large majority of the known cases of juvenile delinquency, while the remainder must be attributed to inherent personal defect. This term includes physical and mental defects, as well as those which may be attributed to a weak sense of inhibition. Of course, it must be borne in mind that direct and indirect causes constantly overlap each other, and that in many instances a case of juvenile delinquency may be found to be due to a combination of environmental conditions and personal defect; as for example, where a weaker child will succumb to an unfavorable environment which a stronger child is able to withstand.

Treatment. Since the advent of the juvenile court, almost thirty years ago, tremendous progress has been made in the methods of

treating juvenile delinquents. The modern idea is to regard such offenders as wards of the state in need of its care and protection, instead of as criminals to be punished for specific violations of the law. Retributive justice has been steadily forced into the background, and in its place new and scientific methods of correction and protection are being developed, to the end "that the care, custody, and discipline of the children brought before the court shall approximate as nearly as possible that which they should receive from their parents, and that, as far as practicable, they shall be treated not as criminals but as children in need of aid, encouragement, and guidance" (New York State Children's Court Act).

The establishment of the probation system, which has made it possible to correct and adjust many delinquents in their own homes under the efficient supervision of the court without commitment to institutions, has perhaps been the greatest forward step in a quarter-century in the treatment of delinquency. The formation of mental clinics in connection with the courts has also contributed very greatly toward a better understanding of the problems of delinquency and their possible solutions. Standardization of methods, intelligent community coöperation between all child-welfare agencies, and scientific governmental studies of the economic and social status of certain classes of children are some of the later developments which have tended in the same direction.

Even when strict disciplinary measures are called for and children have to be sent to detention homes or institutions, a great improvement has taken place over the conditions of the past; for the modern training school, based upon what is known as the "cottage system," is in effect a social laboratory wherein advanced methods are employed for the development and adjustment of the children entrusted to its care.

Great emphasis is being laid to-day on the need of treating each and every case of delinquency as an individual problem. When a child comes before an adequately equipped juvenile court, the case receives the same study which a physician would accord to one of his patients. The child's mental life is diagnosed by the psychiatrist, who reports how best his mental impulses and instincts may be guided, developed, and controlled. The probation officer probes deeply into the underlying causes for the child's anti-social tendencies, his environment, his characteristics, his general history, his social and economic status, and recommends some constructive plan for dealing with him according to his individual needs. In short, the modern treatment of delinquency calls for the study of each case as an individual behavior problem,

in order that the child may be socially readjusted and thus saved to the community as a future asset, instead of being permitted to become a permanent liability.

Increasing emphasis is also being laid on the need for preventive work with the maladjusted or handicapped child while his tendencies are still easily susceptible of proper direction and control. Comparatively speaking, only a few years ago there were no mental clinics, no mother's-pension systems, no bureaus for vocational guidance, no visiting teachers in the public schools, no social-service exchanges, no

Boy Scouts or Girl Scouts, no Big Brothers or Big Sisters, no parental leagues, no community centers. All these and many other organizations have recently sprung into being for the purpose of preventing the development and spread of juvenile delinquency, and at the same time the churches, the schools, the children's societies, the clubs, and the settlements have carried on an intensive work toward a similar end. As a result of these efforts, a great amount of possible delinquency has unquestionably been averted at its source. See JUVENILE COURT.

F.C.H.

THE WORLD BOOK

MODERN

ENCYCLOPEDIA

PICTORIAL

COMPREHENSIVE

Kk

K

K, the eleventh letter of the English alphabet, was derived from the Phoenician *kaph*, which was in form a *K* turned backward. The name *kaph* meant *hollow of the hand*, and it may be that in some way the letter form attempted to represent this, although the resemblance is

not strong. The Greeks adopted the letter and called it *kappa*; when they began to write from left to right instead of from right to left, as did the Phoenicians, they turned it around, giving it practically its present form. In sound, also, it was identical with modern *k*. The Romans used *c* to represent the hard, guttural sound, and had in consequence no use for *k*, though they used it in a few foreign words. It was not until the Normans introduced in English the soft sound of *c* that *k* came to have any particular importance in the English language, but since that time it has been used in words in which the sound of *c* might be ambiguous.

K has only one sound in English, and is silent before *n*, in such words as *knife*. It is frequently used after *c* at the close of a syllable to assure against mispronunciation, if a vowel follows. Thus *lack* would be correctly pronounced if the *k* were omitted, but the participles *lacking* and *lacked* would not be.

KAABA, OR **CAABA**, *kah' a bah*, or *kah' bah*, the most sacred shrine of Mohammedanism, toward which Mussulmans turn their faces in prayer. It is an irregularly cube-shaped, flat-roofed building, in the center of the Great Mosque at Mecca. In the northeast corner is set the famous "black stone." This stone is of irregular oval shape, about seven inches in diameter, and is probably of meteoric origin. When Mohammed returned triumphantly to Mecca, he destroyed all the idols found in the Kaaba, which had fallen into pagan use, but spared the "black stone," which has since been held in extreme veneration by all Moslems. See **MOHAMMED**; **MOHAMMEDANISM**.

KABARA, the Niger River port of Timbuktu (which see).

KABUL, *kah' bool*, the capital of Afghanistan. See **AFGHANISTAN** (The Cities).

KABYLES, *kah bylz'*. See **BERBERS**.

KADIAK, OR **KODIAK**, **BEAR**. See **KODIAK**; **BEAR**.

KAFFIRS, *kaf' urz*, a word meaning *unbelievers*, was originally applied by the Arabs of Africa to the fighting negro races with whom they came into contact in Southeastern Africa. It is now limited to the Bantu tribes inhabiting Zululand, in Natal, Union of South Africa.

The Kaffirs live in conical-shaped huts, with a ground plan from fifteen to twenty feet in diameter and one opening two feet high by eighteen inches wide, which serves as door, window, and chimney. The males become of age when they marry, and polygamy is practiced. Their food is corn-meal mush (mealie), with an occasional addition of fresh beef. The men raise cattle and engage in hunting, while the women of the tribes do the garden and field work.

c.w.

KAFIR CORN, OR **KAFFIR CORN**, *kah' fur*, or *kaf' ur*, a name applied to a group of grain sorghums grown originally in South-Central Africa in a region inhabited by the Kaffir tribe of negroes. Since 1876, the kafirs, as the plants are commonly called, have been cultivated for grain and forage in the dryer sections of the United States. The seeds are nearly as nutritious as shelled corn, and the stems and leaves are juicy and palatable. Both seed and green parts make an excellent grade of silage, and kafir grain is a valued poultry feed. Flour from the seeds finds use in the preparation of rolls and griddle cakes.

The kafirs are stout-stemmed plants that grow from three and one-half to seven feet tall. A dozen or more broad leaves are borne

on the stalks, each of which is terminated by a fairly compact seed head. The plants are called grain sorghums because they do not contain the volume of sugar or sugar-yielding substances found in sorghums that yield syrup. See SORGHUM. B.M.D.

Classification. The kafirs are forms of *Andropogon sorghum*, in the family Gramineae.

KAHOOLAUI, *kah hoo lah' we*, one of the Hawaiian Islands. See HAWAII.

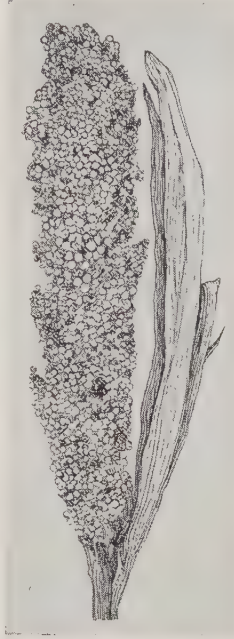
KAINIT. See FERTILIZER (Requirements of Plants).

KAIRWAN, *kire-wahn'*. See TUNISIA.

KAISER, *ki' zur*, from the Latin *Caesar*, in reference to Caius Julius Caesar, is the German word for emperor. The custom of adding *Caesar* to the name of the ruling Roman sovereign was legalized by Diocletian, and spread to Germany after the division of the Roman Empire. Thereafter the custom languished, but was revived by Charlemagne in 800. When William I of Prussia became German emperor, in 1871, he assumed the title, which passed to his successors. In point of present-day interest, the most remarkable of the German kaisers was William II, who came to the throne in 1888 and exiled himself in 1918. The Russian title *czar* comes from the same root word. See WILLIAM (II, Germany); CZAR.

KAISER-BLUME, *ki' zur bloo me*, **CORN-FLOWER**, OR **BACHELOR'S BUTTON**, an annual plant whose long, slender stem, from two to two and a half feet high, bears a shaggy, ragged-looking flower, usually of a shaded-blue color. In Central Europe this flower is a weed, and infests rye and wheat fields.

There are many stories told of the Kaiser-blume. The following gives the derivation of the name, which means *Kaiser's flower*. When Louise of Prussia was escaping from Berlin at the advance of Napoleon's army, she kept her children quiet and comfortable by making chains of cornflowers for them. One of the children afterward became Wilhelm I, and he, in remembrance of the day, proclaimed the cornflower the national flower. It was thenceforth called *Kaiser-blume*. B.M.D.



KAFFIR CORN

Scientific Name. The Kaiser-blume belongs to the family *Compositae*. Its botanical name is *Centaurea cyanus*.

KAISER WILHELM CANAL. See KIEL CANAL.

KAISER WILHELM II LAND. See map, in article ANTARCTIC LANDS AND SEAS.

KAISER-WILHELMSLAND. See NEW GUINEA.

KAKA, *kah' kah*. See PARROT.

KAKI, *kah' ke*. See PERSIMMON.

KALAHARI, *kah lah hah' re*, **DESERT**, a region of Central-Southern Africa, occupying most of Bechuanaland and part of the former German Southwest Africa. It is a basin about 400 miles wide and 600 miles long, and is elevated over 3,000 feet above the sea. Some parts of it are thinly covered by tufts of grass, other parts with scrubby trees. The natives include both Bushmen (which see) and the so-called Ba-kalaharis, who grow watermelons and pumpkins and have herds of goats. The baboon, buffalo, gnu, hippopotamus, giraffe, leopard, lion, rhinoceros, elephant, and zebra are among the animals native to the region. On the map appear a few lakes, including Lake N'gami at the northwest, but these are only shallow salt ponds, which receive the drainage of the rains which fall on the outer edges of the desert. Artesian wells have been bored in a few places by the British. The Kalahari was the scene of part of Livingstone's journeys. See AFRICA (Climate).

KALAKAUA, *kah lah kou' ah*, next to the last occupant of the throne of Hawaii. See LILIUOKALANI; HAWAII.

KALAMAZOO, *kal a ma zoo'*, MICH., the largest city in Southwestern Michigan and the county seat of Kalamazoo County, is situated exactly between Detroit and Chicago, being 148 miles from each. Battle Creek is eighteen miles east, and Grand Rapids forty-eight miles north. The city lies in the fertile valley of the Kalamazoo River, where the rich soil of the bottom muck lands is devoted to celery-growing. The uplands on the edge of the city and valley are diversified by streams and ravines, giving the newer homes in this broken territory distinctive character. The population in 1928 was 56,400, according to Federal estimate. Of the foreign-born, who make up fifteen per cent of the population, the largest proportion consists of Hollanders.

Transportation. Kalamazoo is served by the Michigan Central, the New York Central, the Pennsylvania, and the Grand Trunk (Canadian National) roads. Electric interurban and motor-truck and motor-bus lines give connection with points in all directions. The city is on one of the main automobile highways between the Middle West and New York.

Industry. About half of the industrial wage-earners are employed in the paper mills and allied plants, which manufacture such commodities as

cartons, paper boxes, labels, stationery, and accounting forms. The other workers are engaged in the production of pharmaceutical products, gas grates, uniforms, railway supplies, metal windows, truck transmissions, taxicabs, ventilating systems, auto bodies, sanitary ware, banjos, and other articles.

Institutions. Kalamazoo is the seat of Western State Teachers College, Kalamazoo College (founded in 1833), Nazareth Academy and Barbour Hall (Catholic boarding school for boys and girls), and Kalamazoo State Hospital for the Insane.

History. The place was settled in 1829 by Titus Bronson, who gave the town its central street diagram. Four central blocks were dedicated, two of which are now Bronson Park, containing an Indian mound. The village was called Bronson originally, but the name was changed because another Michigan village had priority. Kalamazoo was incorporated as a city in 1884. The present name is from the Indian for *boiling pot*. The accepted story is that the Indians had annual field games here, of which one was a race to and back from a stated point before a pot of water could be made to boil. In 1918 the commission-manager form of government was adopted. E.S.W.

KALAMAZOO RIVER. See MICHIGAN (Its Rivers).

KALB, JOHANN DE. See DE KALB, JOHANN.

KALE, OR BORECOLE, a variety of cabbage, with very curly leaves which do not form a solid head. It is cultivated as a salad vegetable for winter, and is best adapted to the cooler weather of late fall, gaining added flavor with the frost. Kale is also used as a cattle food. It requires rather fertile soil and frequent weeding. When grown, the plants are cut off at the base quite close to the ground.

KALEIDOSCOPE, *ka li' doh skope*, an instrument with which we see objects in beautiful forms. It is based on the principle of multiple reflection, and it consists of a tube within which are three glass plates that serve as mirrors. These plates extend the whole length of the tube and make an angle of 60° with one another. The tube is closed at one end by a metal plate, which has a small hole in its center, known as an *eyepiece*. At the other end there are two glass plates, one being of clear glass and the other of ground glass, the one of clear glass being closer to the eye. Fragments of colored glass or beads lie between these plates, which is called an *object box*. When the tube is slightly shaken and the eye is applied to the aperture, symmetrical and beautiful figures are produced by the mirrors. No two figures are ever quite alike. Designers often make use of this optical toy to give them patterns for carpets, wall paper, and designs for various fabrics. The kaleidoscope was invented by Sir David Brewster.

KALENDS, OR CALENDS. See MONTH (Days of the Month).

KALEVALA, *kah la vah' lah*, a famous Finnish epic. See FINLAND.

KALLIMA, *kal' e mah*. See PROTECTIVE COLORATION.

KALMAR, UNION OF. See SWEDEN (History); DENMARK (History).

KALMIA, *kal' mih ah*, a genus of North American evergreen shrubs of the heath family, of which the best-known species is the beautiful *mountain laurel*. This plant ranges from

New Brunswick to the Gulf states and west as far as Arkansas, but flourishes most abundantly in the Allegheny Mountains. Its dark, glossy leaves, pointed at the ends and oblong in shape, are used in large quantities in making wreaths, for they are highly decorative. Mountain laurel grows

as a shrub from five to ten feet high, and on the Carolina mountains as a tree thirty feet tall. The lower forms are often found in thickets so dense that one cannot pass through them. The flowers are bowl-shaped, with five



KALMIA



Photo: Visual Education Service

SHEEP LAUREL

short, broad lobes, and are pink, white, or purple in color. Because of its beautiful blossoms and foliage, the laurel is often found in parks, and is utilized in landscape gardening. It is the flower emblem of Connecticut.

Sheep laurel, or *lambkill*, ranging from Newfoundland to Georgia, is a small species whose leaves are poisonous to sheep. B.M.D.

Scientific Names. The genus belongs to the family *Ericaceae*. The mountain laurel is *Kalmia latifolia*; the sheep laurel, *K. angustifolia*.

KALMUCKS, *kal' muks*, a western branch of the Mongolian race, originally were inhabitants of Central Asia, but now dwell not only in many parts of the Chinese republic, but also in Western Siberia and Southwestern Russia. They have been largely a wandering people, but the Russian government under the czars developed many of them into agriculturists. They are brave warriors and daring horsemen, and many were members of famous Cossack regiments in the Russian army. A full-blooded Kalmuck is short of stature and broad-shouldered, with a round head, straight black hair, and a flat, round face with marked Mongolian characteristics. With the exception of a small number of Christians and Mohammedans, the Kalmucks are Buddhists. See COSSACKS. C.W.

KALSOMINE, an incorrect spelling of *cal-cimine* (which see).

KAMA, *kah' mah*, **RIVER**. See RUSSIA (Rivers and Lakes).

KAMCHATKA, *kam chat' kah*, a large peninsula in the northeastern part of Asia, at the eastern end of Siberia, extending in a southerly



LOCATION MAP

direction between Bering Sea and the Sea of Okhotsk. It is larger than the state of Colorado, having an area of 104,433 square miles. A range of volcanic mountains extends from north to south, the highest of which are over 16,000 feet above the sea. Petropavlovsk, the capital, is situated on one of the finest natural harbors in the world. Since winter extends over a period of nine months, and frost is frequently felt even in summer, all attempts at agriculture have been practically abandoned. Fish is the staple of the peninsula. Bear, sable, fox, beaver, otter, seal, and salmon abound, and the dog is the only domestic animal. The population consists chiefly of Kamchadales and Russians. Physically, they belong to the Siberian section of the Mongolian race, and are small-statured, but sturdy. Population, about 7,500.

KAMEHAMEHA, *kah ma hah ma' hah*, the name of several kings of the Hawaiian Islands. See HAWAII (History).

KAMERUN, *kah me roon'*, another form of *Cameroon* (which see).

KANAKAS, *kan a' kahz*, or *ka nak' ahz*, the Hawaiian word for *men*, is the name at first applied by white sailors and traders to the native inhabitants of the Hawaiian Islands, and later to all slaves, contract laborers, etc., of the tropical Pacific islands, without distinction of origin. The word now is used in the sense of "coolie," "contract laborer," etc., but has no vogue except in that section of the world. See HAWAII (The People). C.W.

KANAWHA, *ka naw' wah*. See GREAT KANAWHA RIVER; WEST VIRGINIA (History).

KANDAHAR, *kun dah hahr'*. See AFGHAN-ISTAN.

KANE, ELISHA KENT (1820-1857), an American physician and Arctic explorer, was born at Philadelphia, Pa., and was graduated



Photo: Brown Bros

KANE IN ARCTIC LANDS

From a painting by an artist now unknown.

from the medical school of the University of Pennsylvania in 1842. He was surgeon to the American embassy in China, and traveled in India, Egypt, and Europe. In 1846 he was employed in the government survey of the Gulf of Mexico, and four years later became senior medical officer to the Grinnell Expedition in the unsuccessful search for Sir John Franklin (which see). In 1853 he resumed the



Photo. U & U

KANGAROOS

The large illustration shows the kangaroo baby carriage; this is the manner in which the young are carried. In the inset, the manner of defense against wild animals; the kangaroo, with back to a tree, is ready to deal heavy blows with its powerful leg and foot.

search, and the *Advance*, under Kane's command, remained frozen in the ice for twenty-one months in latitude 79° north. The ship was finally abandoned on account of scarcity of provisions, and the party pushed on to the Danish settlements in Greenland, about 1,300 miles distant, in boats and sledges. Kane reached New York in November, 1855. Failing in health, he sailed for Cuba, and died there. See POLAR EXPLORATION.

Writings. Kane's published accounts of his adventures were called *The United States Grinnell Expedition in Search of Sir John Franklin—a Personal Narrative* and *The Second Grinnell Expedition*.

KANGAROO, *kang ga roo'*, a queer, strangely shaped animal of Australia and the neighboring islands. The large, powerful hind legs and strongly developed tail provide the kangaroo with a unique method of locomotion. It advances by a series of leaps which may vary from a few feet to a distance several times the animal's length. The kangaroo is timid and unaggressive. To outwit its enemies, it relies on its keen senses of sight, hearing, and smell, and on its great speed. However, when hard-pressed, it will defend itself vigorously, striking hard blows with the strong hind legs while supported by the powerful tail. The long, four-toed hind feet, each armed with one especially developed claw, form an effective weapon.

Kangaroos live chiefly on herbs and grasses. When grazing, they drop upon all fours, but their usual position is one of alert uprightness, resting on a tripod of hind legs and tail. They are the most important group among pouched mammals (see MARSUPIALS). There are forty known species, varying in size from that of a hare to a height of seven feet. The head is small and deerlike, with large, erect ears and an elongated muzzle.

The grazing habits of this animal cause heavy damage to grain and forage crops. So sharp are the teeth that the vegetation is clipped more closely to the ground than in the case of cattle or other grazing animals. For this reason, kangaroos have been hunted so persistently that they have almost been exterminated. They are also valued as food and for their hides, which can be made into leather.

The young of kangaroos, numbering from one to three at a birth, are born when very tiny and undeveloped, and are immediately placed by the mother, by means of her lips, in a pocket-like abdominal pouch. There she nourishes and cares for them for weeks, or sometimes months, until they are ready to hop about as their parents do. The fur of kangaroos is soft and of a gray-brown color. The hides of small species, called *wallabies*, are valued for shoes, gloves, and bags, and the flesh is considered a delicacy by the natives. Kangaroos are timid and gentle in captivity. L.H.

Classification. Kangaroos belong to the family *Macropodidae*. Typical species are placed in the genus *Macropus*.

KANGAROO APPLE, a yellow, egg-shaped edible fruit. See *SOLANUM*.

KANKAKEE, ILL. See *ILLINOIS* (back of map).

KANKAKEE RIVER. See *INDIANA* (Rivers); *ILLINOIS* (Physical Features).

KANRED. See *AGRICULTURE* (Improvements in Plant Husbandry).

KANSA, *kahn' sah*, OR **KAW, INDIANS.** See *INDIANS, AMERICAN* (Most Important Tribes).



KANSAS. This central commonwealth of the American Union is called, from its state flower, *THE SUNFLOWER STATE*. It is also known as *THE JAYHAWKER STATE*, from some term of obscure origin which was current in the days of the slavery controversy. Its official name is taken from that of a tribe of Indians who formerly roamed its prairies, and means *People of the South Wind*.

Upon the state seal may be seen a brief sketch of the history of Kansas. Its great plains are the distinguishing feature of the state. Upon them roamed the buffalo and the Indians; Coronado, his army but a glittering speck upon that wind-swept vastness, sought gold in the Indian villages. Across the sun-drenched plains crept the white-topped emigrant wagons following the famous Santa Fe Trail. The "forty-niners" hastened across to California's gold fields, and probably the dust and nuggets which they took later from the Golden State were a trifle compared with the gold which the wheat fields of Kansas now yield. Northward across the plains moved hundreds of thousands of cattle, their owners seeking forage, railroads, and markets. Pushing toward the west came the "iron horse," and four of the great transcontinental railroad systems in time crossed the state. With the railroads came the homesteaders, and the myth of the Great American Desert vanished when Kansas began its steady growth as one of the great agricultural states of the Union.

Size and Location. Kansas is entitled to be called *THE CENTRAL STATE*, for within its boundaries is the geographical center of the United States. On the south the state is bordered by Oklahoma, on the east by the state of Missouri. The great plains of Kansas join those of Colorado on the west, and those of Nebraska on the north.

Except in the northeast, where the windings of the Missouri River cut off a corner, Kansas is a rectangle, with an area of 82,158 square

miles, of which only 384 are water surface. Thus it ranks thirteenth in area among the states of the Union, while in population it is twenty-fourth, most of the states which are larger lying to the west of it, and those which are more populous, to the east.

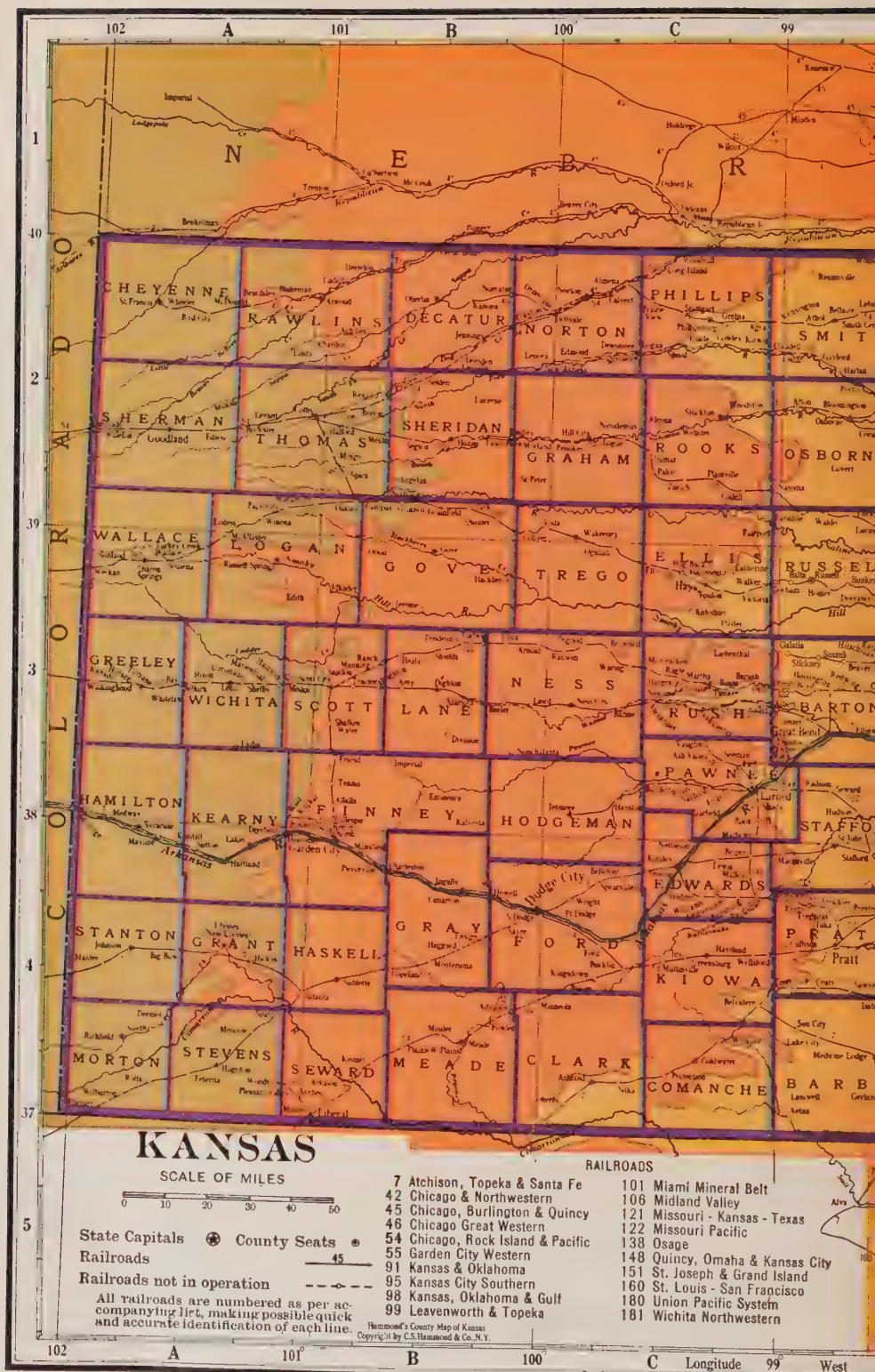
The People of Kansas. Kansas had in 1920 a population of 1,769,257; in 1925 it had 1,812,986. It has an average density of 21.6 to the square mile. The number of inhabitants to the square mile is much greater in the east, which contains most of the cities, than in the west, which is the Plains region. Over thirty-four per cent of the people live in cities of 2,500 or over. More than ninety-three per cent of the population is American-born; but Germany, Russia, Sweden, England, and Austria are fairly well represented. Slightly over three per cent is colored. Kansas has a very representative population, settlers from practically every part of the South and East having found their way to it in its "boom" days.

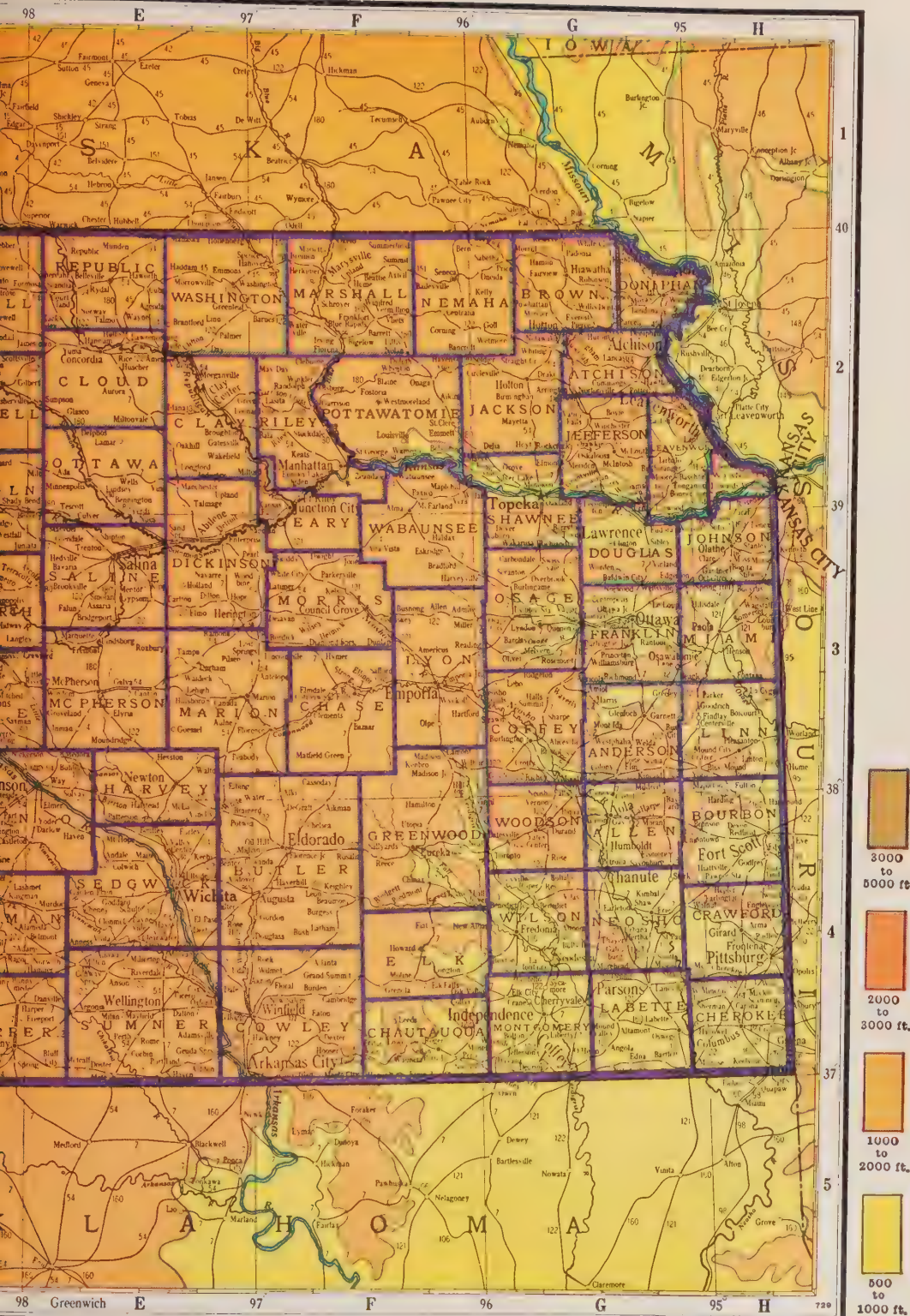
Religion. Of the church communicants, who include somewhat more than one-fourth of the population, approximately one-fourth belong to the Methodist Church, the strongest religious body in the state. No other Protestant Church has half as many members. The Friends, or Quakers, are well represented, and there are several communities of Mennonites. Roman Catholics number about 100,000.

Education. Development of education in Kansas has progressed with remarkable rapidity since the beginning of this century. In 1925 all five public educational institutions of higher learning were put under control of a board of regents appointed by the governor. Agriculture is taught in rural schools, and many such schools are being consolidated for greater efficiency and better instruction. Many high schools offer agricultural instruction, as do the three state teachers' colleges at Emporia, Hays, and Pittsburg. Kansas has a

KANSAS

Abbyville, (D4)...	173	Blue Rapids, (F2)...	1,570	Cottonwood Falls, (F3)...	920	Fort Leavenworth, (H2)...	2,500	Holliday, (H2)...	200
Abilene, (E3)...	5,116	Bluff City, (E4)...	223	Council Grove, (F3)...	2,406	Fort Riley, (F2)...	2,550	Hollis, (E2)...	250
Ada, (E2)...	175	Bogue, (C2)...	250	Courtland, (E2)...	114	Fort Scott, (H1)...	11,763	Holton, (G2)...	2,668
Admire, (F3)...	246	Boicourt, (H3)...	100	Covert, (D2)...	100	Forstia, (F4)...	95	Holyrood, (D3)...	421
Agenda, (E2)...	210	Bonita, (H3)...	100	Coyville, (G4)...	203	Fowler, (B4)...	470	Home, (F2)...	450
Agra, (C2)...	341	Bonner Springs, (G2)...	1,776	Crestline, (H4)...	200	Frankfort, (F2)...	1,330	Homewood, (G3)...	100
Agricola, (G3)...	100	Brazilton, (H4)...	73	Croweburg, (H4)...	693	Franklin, (G4)...	1,440	Hope, (E3)...	554
Albert, (D3)...	154	Breezy Hill, (H1)...	100	Cuba, (E2)...	432	Frederick, (D3)...	130	Howepell, (D4)...	100
Alden, (D3)...	308	Bremen, (F2)...	200	Cullison, (D4)...	235	Fredonia, (G4)...	3,463	Horace, (A3)...	208
Alexander, (C3)...	200	Brewster, (A2)...	403	Culver, (E3)...	213	Freeport, (F1)...	111	Horton, (G2)...	4,212
Aliceville, (G3)...	250	Bridgeport, (E3)...	100	Cummings, (G2)...	250	Friend, (B3)...	100	Howard, (F4)...	1,166
Allen, (F3)...	278	Bronson, (H4)...	555	Cunningham, (D4)...	371	Frontenac, (H1)...	3,002	Hoxie, (B2)...	747
Alma, (F2)...	771	Brookville, (E3)...	235	Damar, (C2)...	400	Furley, (E4)...	198	Hoyt, (G2)...	279
Almena, (C2)...	659	Bucklin, (C4)...	202	Danville, (E4)...	200	Galatia, (D3)...	150	Hudson, (D3)...	216
Altamont, (G4)...	603	Bucknell, (C3)...	787	Dearing, (G4)...	280	Galesburg, (G4)...	171	Hugoton, (A4)...	216
Alta Vista, (F3)...	488	Bucyrus, (H3)...	150	Deerfield, (A4)...	385	Galva, (E3)...	273	Humboldt, (G4)...	2,812
Altoona, (G4)...	852	Buffalo, (G4)...	694	Delavan, (F3)...	150	Garden City, (B4)...	4,099	Hunter, (D2)...	211
Americus, (F3)...	407	Bufville, (G4)...	250	Delia, (G2)...	237	Garden Plain, (E4)...	297	Huron, (G2)...	155
Ames, (E2)...	100	Buhler, (E3)...	496	Delphos, (E2)...	767	Gardner, (H3)...	511	Hutchinson, (D3)...	25,970
Andale, (E4)...	266	Bunkerhill, (D3)...	268	Denison, (G2)...	177	Garfield, (C3)...	355	Idana, (E2)...	200
Andover, (E4)...	150	Burden, (F4)...	492	Dennis, (G4)...	200	Garland, (H4)...	250	Independence, (G4)...	10,900
Anson, (E4)...	150	Burdett, (C3)...	350	Densmore, (C2)...	290	Garrett, (G3)...	2,464	Industry, (E2)...	200
Antelope, (F3)...	100	Burlington, (G3)...	1,477	Denton, (G2)...	183	Garrison, (F2)...	100	Ingalls, (B4)...	250
Anthony, (D4)...	2,539	Burlingame, (G3)...	2,533	Derby, (E4)...	284	Gas, (G4)...	328	Inman, (E3)...	412
Arcadia, (H4)...	1,087	Burns, (F3)...	451	De Soto, (H3)...	375	Gaylord, (D2)...	310	Ionia, (D2)...	7,990
Argonia, (E4)...	490	Burr Oak, (D2)...	574	Detroit, (E3)...	250	Gem, (B2)...	250	Iola, (G4)...	350
Arkansas City, (F4)...	14,003	Burrton, (E4)...	622	Devon, (H4)...	150	Geneseo, (G3)...	523	Irving, (F2)...	362
Arma, (H4)...	2,606	Bushong, (F3)...	115	Dexter, (F4)...	449	Geneva, (D3)...	100	Isabel, (B3)...	293
Arnold, (B3)...	200	Bushton, (D3)...	313	Dighton, (E3)...	554	Geuda Springs, (E4)...	401	Iuka, (D4)...	147
Arrington, (G2)...	100	Byers, (D4)...	212	Dillon, (B3)...	100	Glad, (C2)...	3,102	Jamestown, (E2)...	502
Ash Grove, (D2)...	200	Caldwell, (E4)...	1,954	Dodge City, (C4)...	6,099	Glascio, (E2)...	693	Jarbo, (G2)...	150
Ashland, (C4)...	1,067	Cambridge, (F4)...	291	Doniphan, (G2)...	171	Glenn Elder, (D2)...	616	Jefferson, (G4)...	100
Ashton, (E4)...	150	Campus, (B2)...	100	Dorrance, (D3)...	286	Goddard, (E4)...	235	Jennings, (B2)...	235
Assaria, (E3)...	209	Caney, (G4)...	2,801	Douglas, (F4)...	850	Goessell, (E3)...	150	Jetmore, (C3)...	569
Atchison, (G2)...	15,028	Canton, (E3)...	700	Dover, (G3)...	250	Goff, (G2)...	407	Jewell, (D2)...	769
Atol, (D2)...	317	Carbondale, (G3)...	427	Downs, (D2)...	1,618	Goodland, (A2)...	2,887	Johnson, (A4)...	212
Atlanta, (F4)...	375	Carlton, (E3)...	300	Dresden, (B2)...	166	Goodrich, (H3)...	100	Junction City, (F2)...	6,699
Attica, (D4)...	629	Carlyle, (G4)...	100	Dundee, (D3)...	100	Gorham, (D3)...	450	Kackley, (E2)...	150
Atwood, (G2)...	1,125	Carneiro, (D3)...	100	Dunlap, (F3)...	254	Gove, (B3)...	169	Kanapolis, (D3)...	805
Auburn, (B3)...	100	Carona, (H4)...	550	Duquoin, (D4)...	100	Grainfield, (B2)...	352	Kanorado, (A2)...	324
Augusta, (F4)...	3,297	Cassady, (F3)...	300	Durham, (E3)...	268	Grantville, (G2)...	100	Kansas City, (H2)...	116,053
Aune, (E3)...	150	Castleton, (D4)...	360	Dwight, (F3)...	265	Great Bend, (D3)...	5,389	Keats, (F2)...	100
Aurora, (F2)...	272	Cawker City, (D2)...	738	Earleton, (G4)...	138	Greeley, (G3)...	465	Kechi, (E4)...	100
Axtell, (F2)...	559	Cedar, (D2)...	158	Edgerton, (G3)...	305	Green, (F2)...	295	Keelville, (H4)...	100
Baileyville, (F2)...	200	Cedar Bluffs, (B2)...	150	Edison, (H4)...	210	Greenleaf, (E2)...	767	Keighley, (F4)...	100
Baker, (G2)...	87	Cedar Point, (F3)...	134	Edmond, (C2)...	175	Greensburg, (C4)...	1,168	Kelly, (G2)...	200
Baldwin City, (G3)...	1,243	Cedar Vale, (F4)...	976	Edna, (G4)...	514	Grenola, (F4)...	571	Kendall, (A4)...	100
Bancroft, (F2)...	100	Centerville, (C4)...	150	Edson, (A2)...	100	Gridley, (G3)...	586	Kensington, (D2)...	520
Barclay, (G3)...	406	Centralia, (F2)...	389	Edwardsville, (H2)...	188	Grinnell, (B2)...	284	Kimbald, (G4)...	150
Barnard, (D2)...	348	Centropolis, (G3)...	150	Effingham, (G2)...	634	Gross, (H4)...	480	Kincaid, (G3)...	441
Barnes, (E3)...	100	Chanute, (G4)...	9,829	Elbing, (E3)...	128	Gypsum, (E3)...	611	Kingman, (D4)...	2,403
Barrett, (F2)...	204	Chapman, (F3)...	813	Eldorado, (F4)...	9,500	Haddam, (E2)...	404	Kingsdown, (C4)...	200
Bartlett, (G4)...	177	Chase, (D3)...	262	Elgin, (F4)...	446	Hallowell, (H4)...	200	Kinsley, (C4)...	1,917
Basehor, (G2)...	282	Chautauqua, (F4)...	332	Elk City, (G4)...	635	Halls Summit, (G3)...	150	Kiowa, (D3)...	1,441
Bassett, (G4)...	150	Cheney, (E4)...	597	Elk Falls, (F4)...	255	Halstead, (F4)...	1,238	Kipp, (F3)...	559
Bavaria, (E3)...	150	Cherokee, (H4)...	1,570	Elkhart, (A4)...	1,138	Hamilton, (F4)...	437	Kirwin, (C2)...	250
Baxter Springs, (H1)...	3,591	Cherryvale, (G4)...	4,216	Ellinwood, (D3)...	1,155	Hamlin, (G2)...	208	Kismet, (C4)...	250
Bazaar, (F3)...	100	Chetopa, (G4)...	1,629	Ellis, (C3)...	1,932	Hanover, (F2)...	951	Labette, (F4)...	168
Bazine, (C3)...	301	Chicopee, (H4)...	200	Ellsworth, (D3)...	1,954	Hartner, (D3)...	350	Lafayette, (G3)...	899
Beagle, (G3)...	100	Cimarron, (H4)...	740	Elmdale, (E3)...	229	Harlan, (D2)...	385	Lafontaine, (G4)...	300
Bearsley, (A2)...	150	Circleville, (G2)...	208	Elmo, (E3)...	150	Harper, (E4)...	1,527	Lake City, (D4)...	250
Beattie, (F2)...	406	Clifton, (D3)...	617	El Paso, (F4)...	247	Harris, (G3)...	97	Lakin, (A4)...	579
Beaumont, (F4)...	230	Clay Center, (E2)...	4,315	Elsmore, (F4)...	208	Hartford, (F3)...	549	Lamar, (E2)...	100
Beaver, (D3)...	200	Clayton, (B2)...	615	Elyria, (E3)...	100	Harveyville, (F3)...	282	Lamont, (F3)...	200
Beeler, (B3)...	100	Clearwater, (E4)...	200	Emmett, (F2)...	221	Havana, (G4)...	279	Lancaster, (G2)...	192
Bellaire, (D2)...	200	Cleburne, (F2)...	200	Emporia, (F3)...	12,243	Haven, (E4)...	530	Lane, (G3)...	278
Belle Plaine, (E4)...	685	Clements, (F3)...	674	Englevale, (H4)...	437	Havensville, (F2)...	293	Langdon, (D4)...	181
Belleville, (E2)...	2,271	Clifton, (E2)...	200	Englewood, (C4)...	437	Haverhill, (F4)...	150	Lansing, (H2)...	824
Belmont, (E4)...	140	Climax, (F4)...	200	Ensign, (B4)...	300	Haviland, (C4)...	617	Larkinsburg, (G2)...	100
Beloit, (D2)...	3,032	Clinton, (G3)...	100	Enterprise, (E3)...	748	Hays, (C3)...	4,444	Larned, (C3)...	3,141
Belpre, (F4)...	351	Clyde, (E4)...	1,207	Erie, (G4)...	1,361	Hazelton, (D4)...	281	Latham, (F4)...	242
Belvue, (F2)...	210	Coats, (D2)...	303	Esbon, (D2)...	344	Healy, (B3)...	250	Latimer, (F3)...	150
Bendena, (G2)...	300	Codell, (C2)...	150	Esksridge, (F3)...	634	Heizer, (D3)...	100	Lawrence, (G3)...	12,341
Benedict, (F4)...	203	Coffeyville, (G4)...	16,229	Eudora, (G3)...	591	Hepler, (H4)...	241	Leavenworth, (G2)...	20,889
Bennington, (E2)...	378	Colby, (A2)...	1,665	Eureka, (F4)...	3,575	Herrington, (E3)...	4,010	Lebanon, (D2)...	731
Bentley, (E4)...	150	Colwater, (C4)...	1,042	Everest, (G2)...	370	Herkimer, (F2)...	250	Lebo, (G3)...	612
Benton, (E4)...	235	Colony, (B2)...	205	Fairport, (C2)...	100	Herndon, (B2)...	461	Leocompton, (G2)...	307
Bern, (F2)...	279	Columbus, (H4)...	3,327	Fairview, (G2)...	360	Hesston, (E3)...	425	Leeds, (F4)...	100
Berwick, (G2)...	150	Colwich, (E4)...	261	Fall River, (F4)...	348	Hewins, (F4)...	200	Lehigh, (E3)...	371
Bethel, (H2)...	150	Concordia, (E2)...	5,488	Falun, (E3)...	250	Hiattville, (H4)...	150	Le Loup, (G3)...	150
Beverly, (E3)...	369	Conway, (E3)...	100	Farlington, (H4)...	114	Hiawatha, (H4)...	3,202	Lenexa, (H3)...	401
Rigelow, (F2)...	250	Conway Springs, (E4)...	988	Fellsburg, (C4)...	150	Highland, (G2)...	601	Lenora, (B2)...	556
Bird City, (A2)...	570	Coolidge, (A4)...	102	Floral, (F4)...	100	Hill City, (C2)...	19	Leon, (F4)...	476
Bison, (C3)...	357	Copeland, (B4)...	350	Florence, (E3)...	1,777	Hillsboro, (E3)...	1,462	Leona, (G2)...	300
Black Wolf, (D3)...	100	Corbin, (E4)...	200	Fontana, (H3)...	197	Hillsdale, (H3)...	200	Leonardville, (F2)...	326
Blaine, (F2)...	118	Corning, (F2)...	323	Formosa, (D2)...	334	Holcomb, (A4)...	2,926	Leoti, (A3)...	471
Bloom, (C4)...	200	Corwin, (D4)...	150	Fort Dodge, (C4)...	300	Hollenberg, (E2)...	150	Leoville, (B2)...	100
Bloomington, (D2)...	100							Le Roy, (G3)...	797
Blue Mound, (H3)...	573								





How to Read a Map: See page xvi, facing text page 1.

KANSAS Continued

Levant, (A2).....	300	Morland, (B2)....	409	Pawnee Station, (H4)	100	Saint Paul, (G4)...	714	Turner, (H2).....	200
Lewis, (C4).....	391	Morrill, (G2)....	567	Paxico, (F2).....	279	Saint Peter, (B2)...	100	Turon, (D4).....	461
Liberal, (B4)....	3,372	Morrowville, (E2)	500	Peabody, (E3)....	1,786	Salina, (E3).....	15,624	Tyro, (G4).....	185
Liberty, (G4)....	266	Morse, (H3).....	100	Peck, (E4).....	200	Sallyards, (F4)....	250	Udall, (E4).....	410
Liebertal, (C3)...	150	Moscow, (A4)....	190	Penalosa, (D4)...	300	Satanta, (B4)....	229	Ulysses, (A4)....	387
Lillis, (F2).....	150	Mound City, (H3)	675	Penokee, (C2)...	200	Savonburg, (G4)...	207	Uniontown, (H4)...	280
Lincola, (D2)....	1,630	Moundridge, (E3)	724	Perry, (G2).....	438	Sawyer, (D4)....	268	Urbana, (G4)....	100
Lincolnville, (F3)...	235	Mound Valley, (G4)	722	Perth, (E4).....	150	Saxman, (D3)....	150	Utica, (B3).....	330
Lindsborg, (E3)...	2,077	Mount Hope, (E4)	497	Peru, (F4).....	620	Scammon, (H1)...	1,370	Valeda, (G4)....	100
Linn, (E2).....	264	Mulberry, (H4)...	2,298	Petrolia, (G4)....	100	Scandia, (E2)....	628	Valley Center, (E4)	443
Linwood, (G2)....	369	Mullinville, (C4)...	400	Pfeifer, (C3)....	100	Scott City, (A3)...	1,273	Valley Falls, (G2)	1,239
Little River, (E3)	641	Mulvane, (E4)....	1,143	Phillipsburg, (C2)	1,582	Scottsville, (D2)...	132	Vassar, (G3)....	150
Logan, (C2).....	750	Mundon, (E2)....	214	Piedmont, (F4)...	250	Scranton, (G3)...	627	Vermillion, (F2)...	315
Lone Elm, (G3)...	133	Murdock, (E4)....	250	Pierceville, (B4)...	150	Sedan, (F4).....	1,556	Vernon, (G4)....	150
Longford, (E2)...	180	Muscotah, (G2)...	376	Piper, (H2).....	100	Sedgwick, (E4)...	691	Vesper, (D2)....	150
Long Island, (C2)	246	Narka, (E2).....	228	Piqua, (G4).....	100	Seguin, (B2).....	100	Victoria, (C3)...	496
Longton, (F1)....	692	Nashville, (D4)...	204	Pittsburg, (H4)...	19,182	Selden, (B2).....	391	Vining, (E2)....	195
Lorraine, (D3)....	205	Natoma, (D2)....	607	Plains, (B4).....	431	Selma, (G3).....	100	Vinland, (G3)....	150
Lost Springs, (E3)	203	Navarre, (E3)....	250	Plainville, (C2)...	1,051	Seneca, (F2).....	1,931	Viola, (E4).....	149
Louisburg, (H3)...	589	Neal, (F4).....	200	Pleasanton, (H3)...	1,229	Severance, (G2)...	329	Virgil, (F4)....	603
Louisville, (F2)...	213	Nekoma, (C3)....	150	Plevna, (D4)....	173	Severy, (F4).....	521	Vliets, (F2)....	300
Lovewell, (D2)...	150	Nooduska, (G4)...	3,635	Plymouth, (F3)...	100	Seward, (D3)....	250	W. baunsee, (F2)...	100
Lowell, (H1)....	200	Noesho Falls, (G3)	621	Pomona, (G3)....	436	Shady Bend, (D2)...	100	W. ikarusa, (G3)...	100
Lowemont, (G2)...	300	Noesho Rapids, (G3)	241	Portis, (D2)....	345	Shaffer, (C3)....	100	W. keeney, (C2)...	1,218
Lucas, (D2).....	606	Ness City, (C3)...	1,003	Portland, (E4)....	100	Sharon, (D4)....	290	Wakefield, (E2)...	554
Ludell, (H3)....	300	Netawaka, (G2)...	258	Potter, (G2)....	250	Sharon Springs, (A3)	764	Waldo, (D2)....	260
Luray, (D2).....	469	New Albany, (F4)...	135	Potwin, (E4)....	460	Shawnee, (H2)...	460	Waldron, (D4)...	183
Lyndon, (G3)....	852	New Almelo, (C2)...	100	Powhattan, (G2)...	282	Sherman, (H4)....	100	Walker, (C3)....	100
Lyons, (D3)....	2,648	New Cambria, (E3)	153	Prairie View, (C2)	192	Sherwin Junction,		Wallace, (A3)....	100
McCracken, (C3)	566	Newman, (G2)....	100	Pratt, (D4).....	5,245	Shields, (B3)....	100	Walnut, (H1)....	567
McCune, (G4)....	579	New Salem, (F4)...	100	Prescott, (H3)...	262	Silverdale, (F4)...	150	Walton, (E3)....	220
McDonald, (A2)...	410	Newton, (E3)....	9,831	Preston, (D4)....	393	Silver Lake, (G2)...	344	Wamego, (F2)....	1,554
McFarland, (F2)...	386	New Ulysses, (A4)	387	Pretty Prairie, (D4)	413	Simpson, (E2)....	219	Washington, (F2)	1,419
McLouth, (G2)....	435	Nickerson, (E3)...	1,081	Princeton, (G3)...	191	Sitka, (C4).....	200	Waterville, (F2)...	692
McPherson, (E3)...	4,209	Niles, (E3).....	200	Protection, (C4)...	1,011	Skiddy, (F3)....	100	Wathena, (G2)...	836
Macksville, (D4)...	800	Niotaze, (F4)....	230	Purcell, (G2)....	100	Smith Center, (D2)	1,513	Wauneta, (F4)...	100
Madison, (E3)....	1,439	Noracur, (B2)....	526	Quemeno, (G3)...	575	Smolan, (E3)....	200	Waverly, (G3)...	594
Mahaska, (E2)....	200	Northbranch, (D2)	100	Quincy, (F4)....	150	Soldier, (G2)....	297	Wayne, (E2)....	98
Maize, (E4).....	161	Norton, (C2)....	2,276	Quinter, (B2)....	494	Solomon, (E3)...	987	Webster, (D2)...	250
Manchester, (E2)	256	Norwinton, (G2)	659	Radium, (D3)....	100	Somers, (H3)....	100	Weir, (H4).....	1,675
Manhattan, (F2)...	10,112	Norway, (E2)....	91	Radley, (H4)....	700	South Haven, (E4)	410	Welda, (G3)....	204
Mankato, (D2)...	1,508	Norwich, (F4)....	415	Rago, (D4).....	150	South Hutchinson,		Wellington, (E4)...	6,984
Manter, (A4)....	146	Oakhill, (E2)....	300	Ramona, (E3)....	270	South Park, (H2)...	583	Wells, (E2)....	87
Maple City, (F1)...	100	Oakland, (G2)....	2,333	Randall, (D2)...	305	Sparks, (G2)....	150	Wellsford, (C4)...	119
Maplehill, (F2)...	248	Oakley, (B2)....	931	Randolph, (F2)...	389	Spearsville, (C4)	538	Westmoreland, (F2)	420
Mapleton, (H3)...	239	Oak Valley, (F4)...	100	Ransom, (C3)....	326	Speed, (C2)....	250	Westphalia, (G3)	322
Marietta, (A3)...	100	Oberlin, (B2)....	1,404	Rantoul, (C3)...	208	Spivey, (D4)....	178	West Plains, (B4)	434
Marietta, (F2)...	150	Ocheltree, (H3)...	200	Ray, (D3).....	100	Spring Hill, (H3)...	408	Westmoreland, (F2)	420
Marion, (F3)....	1,884	Oferle, (C4)....	239	Reading, (F3)....	396	Stafford, (D4)...	1,511	Westphalia, (G3)	322
Marquette, (E3)...	701	Ogallah, (B3)...	200	Reamsville, (D2)...	236	Stark, (G4).....	184	West Plains, (B4)	434
Marshfield, (F2)...	3,946	Ogden, (F2)....	352	Redfield, (H4)...	150	Sterling, (D3)....	1,832	Wetmore, (G2)...	452
Marshfield Green, (F3)	166	Oil Hill, (F4)....	220	Reece, (F4).....	100	Stilwell, (H3)...	200	Wheaton, (F2)...	179
Mayetta, (G2)....	267	Oklato, (H3)....	3,372	Reno, (G2).....	100	Stockdale, (F2)...	100	Wheeler, (A2)...	100
Mayfield, (E4)...	200	Olathe, (G3)....	300	Republic, (E2)...	437	Stockton, (C2)...	1,440	White Church, (H2)	100
Meade, (B4).....	902	Olmitz, (D3)....	158	Reserve, (G2)...	167	Strawn, (G3)....	150	White City, (F3)...	617
Medicine Lodge,		Olpe, (F3).....	246	Rexford, (B2)...	73	Strong, (F3)....	1,009	White Cloud, (G2)	486
(D4).....	1,139	Olsburg, (F2)....	175	Richfield, (A3)...	100	Studley, (B2)....	150	White Water, (E4)	542
Medora, (E3)....	150	Omsburg, (F2)....	779	Richland, (G4)...	200	Stuttgart, (C2)...	200	Whiting, (G2)...	424
Melrose, (H4)....	250	Omaha, (F2)....	233	Richmond, (G3)...	401	Sublette, (B4)....	283	Wichita, (E4)....	88,367
Melvern, (G3)...	606	Oneida, (G2)....	187	Riley, (F2).....	357	Summerfield, (F2)	431	Wilder, (H2)....	100
Menlo, (B2).....	350	Opolis, (H4)....	100	Ringo, (H4)....	743	Sun City, (D4)...	300	Willard, (G2)...	153
Meriden, (G2)...	371	Oranoke, (B2)....	100	Riverton, (E4)...	100	Susank, (D3)....	300	Williamsburg, (G3)	332
Merriam, (H3)...	350	Osage City, (G3)...	2,957	Robinson, (G2)...	424	Sycamore, (G4)...	100	Williamstown, (G2)	198
Michigan Valley,		Oswatomie, (G3)...	3,560	Rock, (F4).....	200	Sylvan Grove, (D3)	571	Willis, (G2)....	198
(G3).....	200	Oswego, (G4)....	719	Rockcreek, (G2)...	212	Sylvia, (D4)....	460	Willmore, (C4)...	258
Mirian, (E4)....	100	Otego, (D2)....	150	Rolla, (A4).....	100	Syracuse, (A4)...	969	Wilmot, (F4)....	100
Mirlway, (D3)...	221	Otis, (C3).....	8,498	Rome, (E4)....	156	Talmage, (E2)...	400	Wiley, (F4)....	271
Milran, (E4)....	487	Ottawa, (G3)...	600	Rosedale, (H2)...	7,674	Talmo, (E2)....	106	Wilson, (D3)...	921
Milfred, (G3)...	200	Overbrook, (G3)...	850	Rose Hill, (E4)...	200	Tampa, (E3)....	258	Winchester, (G2)...	447
Millard, (F2)...	150	Oxford, (E1)....	828	Roseland, (H4)...	482	Tasco, (B2).....	100	Windom, (E3)...	260
Miller, (F3)....	200	Ozarkville, (G2)...	450	Rossville, (G2)...	688	Tescott, (E2)....	432	Winfield, (F4)...	11,483
Milton, (E4)....	784	Padonia, (G2)...	100	Roxbury, (E3)...	250	Thayer, (G4)....	406	Winifred, (F2)...	200
Miltonvale, (E2)...	1,795	Page City, (A2)...	100	Rozel, (C3).....	300	Timken, (C3)...	150	Winona, (A2)...	273
Mineral, (H4)....	457	Palco, (C2)....	278	Rush Center, (C3)	300	Tipton, (D2)....	230	Woodbine, (E3)...	257
Minneapolis, (E2)	1,795	Palmer, (E2)....	150	Russell, (D3)....	2,452	Tonganoxie, (H2)	1,123	Woodruff, (C2)...	200
Minneola, (C4)...	150	Parola, (H3)....	3,425	Russell Springs, (A3)	103	TOPEKA, (G2)...	55,411	Woodton, (C2)...	285
Mitchell, (F4)...	861	Paradise, (D2)...	191	Sabetha, (G2)...	2,210	Toronto, (G4)....	719	Wright, (C4)....	100
Moline, (F3)....	84	Park, (B2).....	200	Saffordville, (F3)...	250	Towanda, (F4)...	489	Yates Center, (G4)	2,182
Monmouth, (H4)...	200	Parker, (H3)....	365	Saint Francis, (A2)	795	Traer, (B2).....	200	Yocemento, (C3)...	200
Monmouth, (H4)...	200	Parkerville, (F3)...	123	Saint George, (F2)	222	Treece, (H4)....	1,073	Yoder, (E4)....	150
Mont Ida, (G3)...	119	Parsons, (G4)....	14,839	Saint John, (D3)...	1,543	Tribune, (A3)...	262	Zenda, (D4)....	159
Montrose, (D2)...	150	Partridge, (D4)...	250	Saint Joseph, (H2)	100	Trousdale, (C4)...	250	Zenith, (D4)....	67
Monument, (A2)...	119	Pawnee Rock, (D3)	429	Saint Marys, (G2)	1,216	Troy, (G2).....	986	Zurich, (C2)....	350

progressive public-school system, with 20,000 teachers and 576,000 pupils. Of these, 423,000 are in the elementary schools and 153,000 in 755 accredited high schools. Illiteracy in the state between ages of ten and twenty-five was .62 per cent in 1927, as shown by a Federal report.

Among the institutions of higher learning are the following:

Baker University, at Baldwin, is a Methodist Episcopal college, founded in 1858. It has about 600 students.

College of Emporia, at Emporia, was opened in 1883, and is the official Presbyterian college for Kansas and Southeastern Colorado.

Friends' University, at Wichita, a well-known institution, was organized and is supported by the Friends.

Kansas City University is a United Brethren college, which was opened in 1896 by the Methodist Protestant denomination and United Brethren. It has about 400 students.

The Municipal University, at Wichita, was formerly Fairmount College, founded in 1892 by Congregationalists as the "Vassar of the West." It is the first municipal university to be organized in Kansas.

Ottawa University, at Ottawa, was founded in 1865 by the Baptists.

The State Agricultural College, at Manhattan, was founded in 1863. The college owns over 1,400 acres of land, devoted to educational and experimental work. Besides agriculture, courses are offered in engineering, veterinary medicine, general science, and home economics.

Washburn College, at Topeka, is a Congregational college opened in 1865. It has over 1,400 students.

University of Kansas, the head of the higher institutions of the state, is a coeducational institution supported by appropriations from the state, income from land endowments, student fees, and private gifts. It was founded by the legislature of Kansas at Lawrence in 1864, and began work in 1866. The university consists of the graduate school, college of liberal arts and sciences, school of engineering, school of fine arts, school of law, school of pharmacy, summer session, school of medicine, school of education, division of university extension, and division of state work. In connection with the latter, it carries on a large amount of public-service work for the state.

In addition to the schools listed above, the following are locally important: Bethany College, Lindsborg; Bethel College, Newton; Kansas Wesleyan University, Salina; McPherson College, McPherson; Marymount College, Salina; Southwestern College, Winfield; Saint Benedict's College, Atchison; Saint Mary's College, Saint Mary's; and Sterling College, Sterling. Altogether, some thirty institutions of higher learning have a total enrollment of about 30,000 students, placing Kansas first in the United States in its percentage of college students.

Institutions. The charitable institutions include three hospitals for the insane, at Topeka, Osawatomie, and Larned; a hospital for epileptics at Parsons and a home for feeble-minded at Winfield; a school for the blind at Kansas City, one for the deaf at Olathe, and an orphans' home at Atchison. In the penal in-

stitutions, the indeterminate sentence is in force; among these institutions are the state penitentiary at Lansing, an industrial home for boys at Topeka, one for girls at Beloit, and a reformatory for young men at Hutchinson. Near Leavenworth there is a Federal prison.

Physical Features. *Surface and Soil.* Kansas is one of the prairie states, and almost its whole surface is a gently rolling plain, with occasional rounded hills which never reach a greater height than 500 feet above the surrounding country. But there are differences in the plains. In the east they are part of the central prairie region; in the west they are of the great plain which forms one of the steps up toward the Rocky Mountains. The slope is so gentle, however, that a person traversing the state does not realize that, between the eastern boundary and the western, he has risen about 3,000 feet. The lowest point, 725 feet above sea level, is in the Verdigris River Valley, in the southeast; the highest, on the western border, is 4,135 feet; and the average for the state is 1,800 feet. Throughout the state there is little rugged scenery save along the Missouri River, where bluffs rise to heights of 200 feet, and in the valleys of a few other rivers in the east, which are so sharply worn away as to be almost gorges.

The northeastern part of Kansas lay ages ago in the region of glaciers (see GLACIAL EPOCH), and, like all other glaciated areas, it has a very rich soil. The soil throughout the state is chiefly loam of various types, and exceptionally fertile.

Rivers. Owing to the gentle, even land slope, the drainage of Kansas is good. All the rivers have an eastward flow, and many of them a slight southern trend, as well. The Missouri, as stated above, crosses the northeast corner, and into it flows one of the two great rivers of the state, the Kansas, which, with its tributaries, drains all the northern part.

In the south the chief river system is that of the Arkansas, which includes as tributary streams the Walnut, the Pawnee, and the Little Arkansas. There are, also, in the southeastern section, the Marais des Cygnes, the Verdigris, and the Neosho. The latter two join the Arkansas after crossing the state line. Of natural lakes, Kansas has practically none, but a system of artificial lakes has recently been started at state expense.

The traveler through Kansas frequently can follow the course of a river in the distance by the rows of trees which border it, for, save in such locations, there are few native trees. The government, however, has interested itself in the question of forests, and has, with excellent success, planted considerable areas, especially in the arid sections. Many cities have enough shade trees to give them the appearance of parks or forests.



A SQUARE MILE OF WHEAT

The supremacy of Kansas as a wheat-growing state is explained by the hundreds of such fields as the one shown here.

Climate. Kansas has a very healthful climate, chiefly because of its dryness. Clear skies, bright sunshine, cool nights even in summer when the days are hot, fairly mild winters—these are the pleasant features. The most unpleasant in the western part of the state is the high wind, which in summer is likely to be dust-laden. In the northern part of the state, the average yearly temperature is 52° , and in the southern, 58° ; the extreme range in the course of a year is from zero or a few degrees below to 100° above.

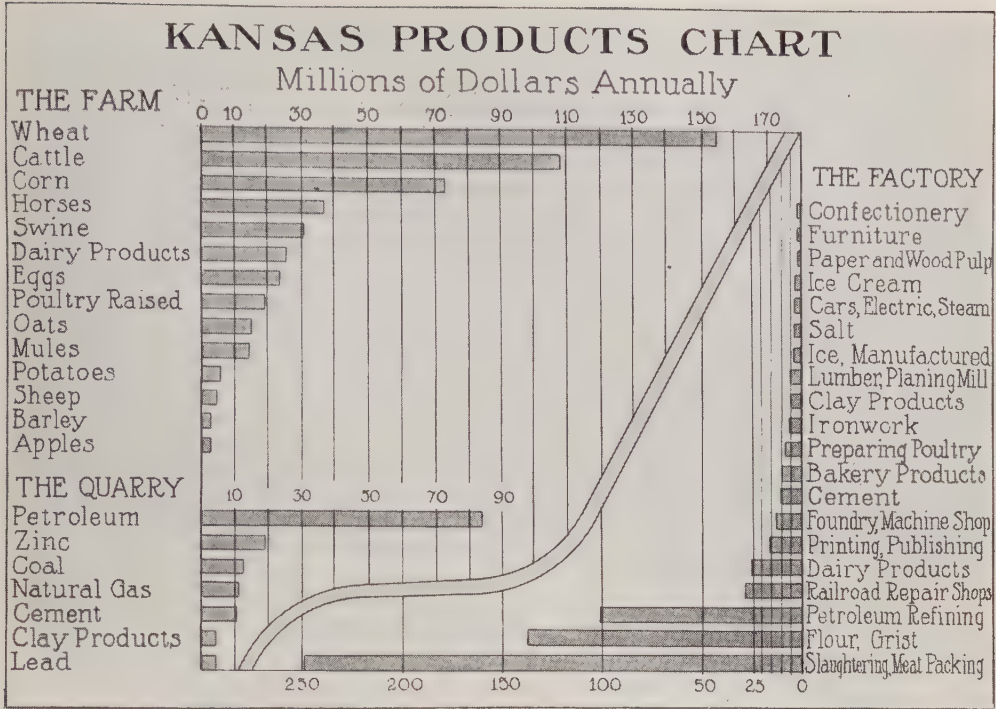
Little snow falls, and the average rainfall is but twenty-seven inches. This is very unevenly distributed, the eastern third having from forty to forty-four inches, and the extreme western sections from ten to twenty.

Agriculture. The chief resources of Kansas are its fertile soil and its favorable climate, which permit the growing of almost all temperate-region crops, except in the western part, where the rainfall is inadequate. Agriculture is the chief industry, and agriculturally Kansas is one of the leading states of the Union. In the southeastern section, the crops are fairly general, corn, oats, rye, potatoes, sorghum, hay, flax, and fruit flourishing; but in the northeastern, the most important of these is corn, a crop which has run well over a hundred million bushels annually throughout a period of years. Among the fruits, apples hold first place, although peaches, plums, cherries, and pears are grown.

West of this region is a limestone country, in a few places too rough for general farming, but furnishing excellent grazing. This section is famous for livestock, fattened upon the prairie grass. The chief crops there are alfalfa, sorghums, milo, soy beans, kafir, feterita, broom corn, and native grasses.

The central belt is devoted to wheat, wholly of the winter variety, and this is the most extensive crop of the state, as regards acreage, amount, and value; from 90,000,000 to 150,000,000 bushels are harvested each year. Westward are the arid lands, no less fertile but considerably less productive. Time was when this region was far more thickly populated than at present, for occasional years of abundant rainfall encouraged people to settle there and plant crops; but year after year of drought brought great hardship, and to-day, comparatively few crops are grown there save in the stream valleys, where irrigation is practiced. This is a natural grazing country, however, and the raising of livestock is the main industry.

Kansas is one of the four greatest cattle-producing states. Over 15,000,000 acres are used for pasture land. Animals sold for slaughter bring in an annual return of over \$75,000,000. Butter brings in over \$23,000,000 yearly, while poultry and eggs add about \$20,000,000 to the income from agricultural resources. With agriculture as the predominating industry of the state, the long-continued and uninterrupted service rendered by the Kansas State



Board of Agriculture has given to it a high rank for its educational, as well as its utilitarian, value. The records of this Board are older than the state itself, and are so comprehensive, so accurate, and so continuous as to form a mirror of the agricultural history of the state which is without parallel elsewhere.

Minerals. The mineral resources of Kansas are by no means insignificant, even though the state has no mountains which conceal great veins of the precious metals. Fuels, coal, petroleum, and natural gas are the most important minerals. Coal, which is of the bituminous variety and of excellent quality, is mined largely in the southeast. Local needs are well supplied, and a surplus is left for shipment. For a time it seemed that the supply of natural gas was almost unlimited, but the high-water mark was reached in 1923, when the yield was valued at more than \$11,000,000; since then there has been a gradual decrease, and a number of industries have suffered from this lessening production. Kansas is one of the chief producers of petroleum, usually ranking about fifth among the states in this fuel.

Zinc, in the production of which it ranks second among the states; portland cement; lead, the mining of which is largely incidental to that of zinc; excellent building stone in great quantities; gypsum, clay, and chalk are other mineral products of importance. In the early days when the Indians were the lords of

the prairie, the salt licks of this region attracted great herds of buffalo from all the surrounding territory. To-day, Kansas is fourth in rank among the salt-producing states.

Manufactures. Without much timber and without deposits of iron, Kansas is limited in its materials for manufactures, but out of its agricultural resources have grown manufacturing industries of great importance. Long one of the very lowest of the states in the value of its manufactures, it had advanced by the beginning of the third decade of the twentieth century to fourteenth place, almost entirely as a result of its agricultural growth. The chief of its manufacturing industries are those connected with slaughtering and meat packing, which have their center at Kansas City, Kan. Only Illinois surpasses Kansas in this industry.

Flour and grist-mill products, in which Kansas ranks usually third among the states, make up, with the products of the meat-packing industry, nearly three-fourths of the total manufactured products of the state.

The building and repairing of railroad cars, the extensive manufacture of butter, cheese, and condensed milk, the smelting and refining of zinc, and the making of glass are other industries of importance.

Transportation. Its central position has given Kansas a decided advantage in the matter of railroads, for a number of the great trunk lines which connect the East with the



Photo: U & U

FIRST CAPITOL BUILDING

Still standing, near Kansas City, at a point known as Shawnee Mission, is the stone building of two stories which was the first Kansas state capitol. Before statehood, the lower floor was occupied by the representatives, and the upper floor by the territorial council, which corresponds to the present state senate. The date on the building is that of the first session of the territorial legislature.

West and South pass through it. In the eastern and central parts, these are so well supplemented with cross lines that the transportation facilities are unusually good, and only in a few localities in the west, where population is sparse, is there any lack. The state has about 9,500 miles of railways, of which almost a third is owned by the Atchison, Topeka & Santa Fe. Other roads serving the state are the Chicago, Rock Island & Pacific, the Saint Louis & San Francisco, the Missouri, Kansas & Texas, the Union Pacific System (the first railway in the state), the Kansas City Southern, the Kansas City, Mexico & Orient, the Burlington, the Grand Island, and the Missouri Pacific.

Of water transportation there is little, only the Missouri River on the northeastern frontier being navigable.

Government. Kansas is governed under a constitution which dates from 1861, but which has been amended several times. The procedure with regard to amendments is about as in other states; either house of the legislature may propose them, both houses must approve them by a two-thirds vote, and a majority of the voters of the state must ratify them.

The legislative body consists of two houses—a senate of not more than forty members, elected for four years, and a house of representatives limited to 125 members, chosen for a two-year term. Sessions of the legislature begin in January of the odd years.

The chief executive officer is the governor, the rest of the officials consisting of a lieutenant governor, secretary of state, auditor, treasurer, attorney-general, and superintendent of public instruction, all elected for two years. The governor possesses the pardoning and the veto power, the latter extending to separate items of an appropriation bill.

At the head of the judicial system is a supreme court of seven judges, who hold office for six years. Below this are the district courts, each headed by a judge elected for a four-year term; the probate courts, one in each county; and, at the bottom of the system, the justice courts. The larger cities have special city courts.

Kansas tried the experiment of an industrial court for the compulsory settlement of labor disputes, but in 1925 this court was declared unconstitutional by decree of the United States Supreme Court. Since 1880 Kansas has been conspicuous as a prohibition state, and both temperance and anti-temperance orators have pointed to it to illustrate their arguments, with the argument all on the side of prohibition. The sale to and use of tobacco by minors is prohibited by law. Many cities have adopted the commission or the city-manager form of government. By an amendment to the constitution passed in November, 1912, the right to vote was extended to women, long in advance of national action on the question. Since 1861, women have voted in school-district meetings. Kansas had the honor of

originating the famous "blue sky" laws (which see).

History. *The Early Years.* Kansas has had some very interesting and romantic chapters in its history, which began, so far as the white men were concerned, in 1541, when the Spanish explorer, Coronado, journeyed across the territory in search of the wealthy cities known as *El Quivira*. The great plains seemed endless to the little army of Spaniards; trails were obliterated so fast that heaps of bones were piled up to mark the way taken; and shots were fired at intervals, to keep the hunting parties from losing the main band. After days of fruitless travel, Coronado turned northward with about thirty men, sending the rest of the army back to Mexico. Eventually, Coronado reached the first of the Indian cities northeast of the Great Bend of the Arkansas. Here for centuries lived the Wichita Indians, but in their villages, as in the Zuni towns of New Mexico, Coronado found but disappointment in his quest for gold. His guide confessed that he had been commissioned to take the Spaniards out upon the great plains in hope of losing them, so they could not return to New Mexico. Back across the plains rode Coronado, disillusioned and unable to vision the vast, golden wheat fields which, nearly four centuries later, were to bring unbelievable wealth to the region.

The land was left in the possession of the Shawnee, Osage, and Omaha Indians for over two centuries. Frenchmen visited it in 1719, but they, too, merely passed through, leaving little or no mark, but assuming nominal ownership in the name of France. With the purchase in 1803 of the vast territory of Louisiana, the United States gained possession of most of the present state of Kansas, the rest coming as a grant from Texas in 1850. Lewis and Clark, Pike, and Long all explored the region, but brought back no glowing tales of it, describing it all as a part of the "Great American Desert, a useless waste of sand."

The first white settlement was made in 1827 at Fort Leavenworth, but even before that time, trade was begun with Mexico over the famous old Santa Fe Trail. When the rush to California and Utah began, in the "forties," Kansas lay on the line of march, and an almost endless train of "prairie schooners," great canvas-covered wagons, crossed the territory. Gradually, it came to be known that much of the region was most promising, and some of the "prairie schooners" came to anchor there instead of continuing westward, but in 1854 the total population had reached not more than seven hundred.

Territorial Days. Until 1821, Kansas was a part of Missouri; but from that date until 1854 it was an unorganized territory, peopled chiefly by Indians. Beginning in 1852, appeals were

made to Congress to organize the territory of Kansas, but not until 1854 were the appeals effective. The Kansas-Nebraska Bill, which created a territory of Kansas far larger than the present state, and including much of Colorado, repealed the Missouri Compromise of thirty-four years before and left the decision of the slavery question to the people of the territory. Immediately there began a fierce



Photo: Visual Education Service

A PIONEER HOME

A dugout of an early Kansas settler.

and bitter struggle. Immigrants from the South and from the North flocked to the territory, "squatters" from Missouri playing a particularly large part, and because of these latter, the first elections, in 1855, made the slavery party victorious. The anti-slavery men contested the election on the ground that more than twice as many votes had been cast as there were voters in the territory; they called a convention in October, 1855, and adopted a constitution prohibiting slavery. This constitution was accepted by the people, the pro-slavery men refusing to vote, and an election held under it in 1856 resulted in the choice of a free-state governor.

The matter was not to be settled thus quietly, however. Both sides had armed themselves; both sides were only waiting for an opportunity to break out in open violence; and the opportunity was not long in coming. After several preliminary outbreaks, there occurred in May, 1856, the ill-advised raid of John Brown and his sons on Pottawatomie Creek, and for months the state was given over to the horrors of a border war. Finally, late in 1856, Federal troops were invited to the rescue by Governor Geary, and the period of lawlessness and crime was brought to an end. A constitution adopted at Lecompton by the pro-slavery party was submitted to the people early in 1858. It was rejected, and the pro-slavery party began to see that its chances for dominance were lessening, so steadily was the number of Northern immigrants increasing. At last a constitution prohibiting slavery was adopted in 1859, and on January 29, 1861,

QUESTIONS ON KANSAS

(An outline suitable for Kansas will be found with the article "State.")

How many states are larger than Kansas? How many have a greater population? Where are most of the larger states? Most of the more populous?

Why would it not be very profitable to set up in Kansas a plant for the manufacture of fertilizers?

What substance that appears on the table with every meal is produced in great quantities in this state?

How did this territory come into the possession of the United States? How did the early explorers describe it?

What improvement was made in 1925 in the control of educational institutions?

As you travel across the plains of Kansas, how can you detect the presence of a river in the distance?

What has been the cause of the recent growth in manufactures?

How did this territory profit by the finding of gold in California?

What is one disagreeable feature of the climate of this state? What are several of its pleasant features?

How has the location of the state affected its railway mileage?

Describe the part taken by Kansas in the slavery struggle. What two legislative measures had a bearing on this question?

What is the leading industry of the state?

How are the two great manufacturing industries related to it?

When did the present constitution of the state go into effect?

What was the Lecompton Constitution? Why was it never made the real constitution of the state?

What recognition does the educational system take of the needs and wishes of the rural population of the state?

How many times as many representatives as senators may the state have? How often does the legislature meet?

How did Kansas rank among the states as to the proportionate number of soldiers furnished to the Union army? Why was it ever called "Bleeding Kansas"?

What church has the largest membership?

What laws that have been placed on the statute books show the progressive character of the state?

Give two popular names for this state and explain at least one of them. What is the meaning of its official name?

How much higher is the western boundary line than the eastern? Is the loftiest point in Kansas higher or lower than that of Illinois? Wisconsin? Maine?

What experiment tried by the state was declared unconstitutional?

Name a famous Spanish explorer who sought for gold and treasure in Kansas. What is the real wealth of the state?

What valuable mineral product of the state was important even before the coming of the white man?

With what difficulties did the early Kansas farmers have to cope?

What book tells the story of those days?

What is meant by the "cow cities"?

Tell the story of John Brown's Raid. Why was it considered "ill advised"?

Out of what territory was Kansas formed?

How does Kansas rank in the production of cattle?

Where is there a natural market for them?

What is there interesting about the water area of Kansas?

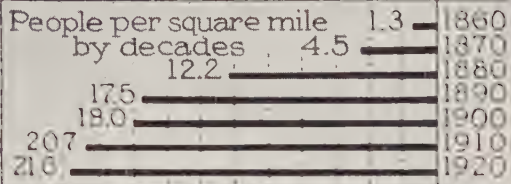
When was the present state constitution adopted?

Name the three largest cities of Kansas.

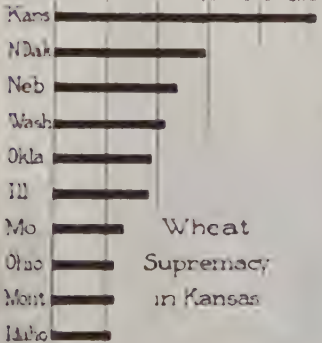
KANSAS

★Geographical
Center

of the
United States

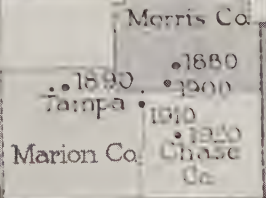


Production
Figures in Millions of Bushels

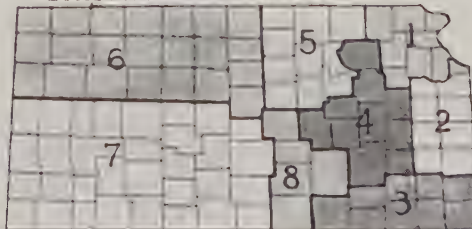


Masonic Temple
at Topeka

Center of
population



Congressional Districts



Kansas was admitted to the Union as the thirty-fourth state, entering just prior to the War of Secession.

Statehood. The new state was very loyal, sending to the Union armies a larger number of soldiers in proportion to its population than any other state. A sort of guerrilla warfare was kept up by the Confederates in the eastern part, and added to the horrors caused by the drought and famine of 1860. "Bleeding Kansas," they called it then, but immediately after the close of the war, a period of rapid development set in. There was a steady stream of immigration, and in 1868 railroads began to do their part in expansion; four years later there were 2,000 miles of track under operation. There were occasional Indian troubles, but after 1868 most of the tribes were moved to Indian Territory, now a part of Oklahoma.

South of Kansas lay the great cattle-raising region. Across it ran the "Long Trail," up which the cattle were driven from the south, great herds moving slowly toward the nearest railroads. Abilene, Wichita, Dodge City, and Great Bend blossomed in a frenzied bid for prominence as cattle markets. The railroads competed for the more southern rights of way, in order to be the first to tap the flood of north-bound cattle.

By 1885, however, the situation had changed and the "cow cities" were welcoming the homesteaders as the railroads daily brought new settlers. It has been claimed that the railroads originated the "land boom" of 1886. Many roads had land for sale, but in general they wanted more freight traffic. Many settlers came who prospered, but in the wake of the legitimate expansion came the "land boomer," with his fraudulent promises and quack irrigation schemes, with bonds worth less than the paper they were written upon. Hundreds of small farmers were starved out or became disheartened by the long conflict with "dry years," blizzards, prairie fires, and the high cost of water rights. In *The Spanish Borderlands*, Emerson Hough says the phrase written on a farmer's wagon top, "Going back to my wife's folks," became historic. The hardy pioneers, however, who lived through the early days of struggle and dissension in Kansas, were the builders of a sturdy, prosperous state.

The later events in the history of the state have been concerned chiefly with legislative questions, over many of which there have been sharp contests. The prohibition question came up first, to be settled, after a long controversy, in favor of the temperance forces. This was succeeded by strong anti-trust agitation, and by a long-continued campaign for woman suffrage, both resulting in legislative enactment or constitutional amendments (see *Government*, above). For the most part, the state

has been, throughout its history, Republican in politics. G.A.A.

Related Subjects. The following articles in these volumes will be of interest in connection with the study of Kansas:

CITIES AND TOWNS

[For locations of towns and cities not listed below, see the back of the state map.]

Kansas City	Topeka	Wichita
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HISTORY

Brown, John	Lewis and Clark Expedition
Coronado	Louisiana Purchase
Indian Territory	Missouri Compromise
Kansas-Nebraska Bill	Pike, Zebulon
Lecompton Constitution	

PRODUCTS AND INDUSTRIES

Apple	Meat and Meat Packing
Cattle	Peach
Coal	Salt
Corn	Wheat
Dairying	Zinc
Flour	

RIVERS

Arkansas	Missouri
----------	----------

KANSAS CITY, KAN., the largest city in the state and the county seat of Wyandotte County, is situated on the Kansas (or Kaw) River at the point where it meets the waters of the Missouri River. Chicago is 483 miles northeast, and Saint Louis, Mo., is 283 miles southeast, by rail. The city occupies both banks of the Kansas River, and on the east adjoins Kansas City, Mo. (which see), the dividing line being the state boundary line. Across the river at this point are fourteen bridges. Industrially and commercially, the two municipalities are as one city, having the same freight and passenger terminals, telephone system, and street-car service; the municipal government of each, however, is independent. Population, 1928, 118,300 (Federal estimate).

Transportation. Transportation is provided by the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Chicago Great Western, the Union Pacific, the Kansas City, Kaw Valley & Western, and the Missouri Pacific. Freight and passenger service is afforded by interurban and motorbus lines.

Industry. After Chicago, Kansas City and its companion city constitute the most important livestock market in the United States. The livestock exchange is in Missouri, the packing houses are in Kansas, and the state line runs through the stockyards, of which ninety-two per cent are in Kansas. Kansas City, Kan., is also an important grain center.

The city has over 160 manufacturing plants. Besides meat-packing products, the chief manufactures are foundry and machine-shop products, railroad cars, bread and other bakery products, druggist preparations, cooperage products, and ice.

Education. For advanced education there are Kansas City University (United Brethren), Western University, for colored students, a Baptist theological seminary and training school, and a college of medicine and surgery.

History. When settled in 1843, by the Wyandotte Indians, the place was known by their

name. White people began to settle in the village, and in 1858 a town was incorporated. A year later, it was given a city charter. In Wyandotte, in July, 1859, the Kansas constitution was drawn up, and the city was the scene of considerable anti-slavery agitation [see KANSAS (History)]. The present charter was

granted in 1886, when Armourdale, Armstrong, and Wyandotte were consolidated as the city of Kansas City. In 1910 the commission form of government was adopted; in 1924 a zoning ordinance was favorably voted upon, and in 1925 a war memorial building was erected.



K The STORY of KANSAS CITY

KANSAS CITY, Mo., the second city in the state in population, ranking next to Saint Louis, is noted primarily as a grain and livestock market. It is situated on the western border of the state, in Jackson County, at the point where the Missouri River is joined by the Kansas (or Kaw) River. Adjoining the city on the west is Kansas City, Kan. The two towns, in different states, form one great metropolitan district. Saint Louis is 280 miles southeast and Chicago is 483 miles northeast, by rail. Population, 1928, 391,000 (Federal estimate).

General Description. Since the early days of the city, when settlers began to build homes on the rugged bluffs towering above the river, so much has been done to improve natural surface conditions that Kansas City is now classed with the most beautiful cities of the Union. It is built on three terraces, the wholesale and manufacturing districts occupying the lowest part, and the business section the elevation above, the two being connected by viaducts and tunnels. The upper part of the city is reserved for the residential district, and here, where hilly surface permits magnificent landscape treatment, possibly the greatest improvement in the city is noticed.

The park and boulevard system of Kansas City, comprising 3,470 acres of parks and parkways and 105 miles of continuous boulevards, is widely admired. Especially noted is the beautiful Cliff Drive, which, cut in the hillside, winds in and out for three and one-half miles, affording fine views of rock formation on the one side, and a panorama of the river below, on the other. Swope Park (1,334 acres), the largest and the most beautiful of the parks, was given to the city in 1896 by Colonel

Thomas H. Swope. There are numerous breathing spots and playgrounds in the more congested districts: even the business section has its area of green.

Transportation. Through the service of the following thirteen railway trunk lines, the city has become one of the largest distributing points in the United States: the Atchison, Topeka & Santa Fe; Chicago, Burlington & Quincy; Chicago & Alton; Chicago Great Western; Chicago, Milwaukee, Saint Paul & Pacific; Chicago, Rock Island & Pacific; Kansas City Southern; Missouri Pacific; Missouri, Kansas & Texas; Quincy, Omaha & Kansas City; Saint Louis and San Francisco; Union Pacific; and Wabash.

Several interurban and motorbus lines operate out of Kansas City, giving excellent transportation facilities, both freight and passenger, to the immediate surrounding territory. To facilitate railroad transit, four railway bridges have been constructed across the river, and a system of depressed tracks, costing \$50,000,000, has been built by the Kansas City Terminal Railway.

A municipal airport in North Kansas City and Fairfax Field in Kansas City, Kan., afford adequate space for landing and factory sites.

Commerce and Industry. Kansas City, Mo., and Kansas City, Kan., together known locally as Greater Kansas City, and having a population exceeding 500,000, are one family industrially and commercially, using the same freight and passenger terminals, the same street-car system, and the same telephone service. The strongest bond, however, between Kansas City, Mo., and the sister city in Kansas is formed by their grain, livestock, and meat-packing interests. The livestock industry of the two cities combined is second only to that of Chicago. Among the cities of the Union, Kansas City, Mo., ranks first as a primary winter-wheat market and third as a primary grain market. It controls an extensive wholesale and jobbing trade as the distributing point of a rich agricultural territory to the west and southwest.

It is also a leading hay, mule, and lumber market, is the largest distributing point in the country for



UNION STATION AND TERMINAL

agricultural implements and farm tractors, and does an extensive business in coal, lime, cement, and flour, milling being one of its rapidly growing industries. An important factor in the prosperity of the city is its location near the great oil fields in Oklahoma, and its nearness to raw material and vast deposits of coal, so essential to industry.

The city ranks third in the Union in the manufacture of flour, and is an important center for the production of bakery goods, men's and women's clothing, creamery and dairy products, groceries of all kinds, soaps, chemicals, stock feed, iron and steel products, and refined oil. An enterprise of recent development is the making of open-hearth steel. The value of all manufactured products is approximately \$700,000,000 a year.

Education, Institutions, and Buildings. In addition to over 130 public schools, the city has institutions for special training in medicine, dentistry, law, engineering, music, business, and domestic science. There are parochial, private, and college-preparatory



KANSAS CITY IN 1846

From an old print.

schools, and within the radius of a few miles are the Kansas City University at Kansas City, Kan.; Baker University, at Baldwin; William Jewell College, at Liberty; and Park College, at Parkville.

The finest structure in the city is the new Union Station, which was erected at a cost of \$6,000,000. It is one of the largest railroad terminals in the United States. Directly across from it stands the Memorial to Kansas City's war heroes. The shaft is 280 feet high, flanked by a hall of records and a veterans' meeting hall. A fire burns constantly at the top of the shaft. From its top, accessible by an elevator, a fine view of the city can be obtained. The cost of \$2,500,000 was raised in one week by popular subscription. Kansas City has a United States Weather Bureau Station and a Federal Reserve Bank, headquarters of the Tenth Federal Reserve District.

History. Kansas City was originally a fur-trading post, known as Westport Landing. In 1838 the town was organized under the name Kansas, originally spelled "Kanzas." It is commonly thought that the city was named for the state of Kansas, but this is an error, as all territory west was then known as the Nebraska Territory; Kansas City and the state of Kansas probably received their names from the same source, the Kanzas tribe of Indians. The town was incorporated as the "Town of Kansas" in 1850; the name was changed to "City of Kansas" in 1857, and the present name was adopted in 1880. Within five years after its settlement, the town had almost the entire trade of New Mexico, traffic being along the highway known as the "Santa Fe Trail." A huge rock in one of the city's parks now marks the original route.

The first postoffice in Kansas City was established in 1845, and ground for the first railroad was broken in 1860, by the Pacific Railroad, now the Missouri Pacific. The first railroad west of the Missouri River, the Kansas Pacific, was commenced at Kansas City in 1863; it is now the Union Pacific Railway. The completion of the first bridge across the Mis-



Photos: U & U; P & A

In Kansas City. Above, the War Memorial, with inset showing night illumination. Below, an airplane view of the city, with the Missouri River in the distance.

3745

souri River in 1869 at this point was an event of importance. The rapid development of the city has been indicated above. In 1923 it adopted a comprehensive zoning system, and in 1925 the electorate voted to establish the council-manager form of government. R.G.

KANSAS CITY UNIVERSITY. See **KANSAS** (Education).

KANSAS INDUSTRIAL COURT. See **ARBITRATION** (Industrial Arbitration).

KANSAS-NEBRASKA BILL, a bill introduced in the American Congress by Stephen A. Douglas in 1854, which divided and organized the territories of Kansas and Nebraska. The original bill contained, as an important provision, Douglas's "sovereignty" idea, that "all questions pertaining to slavery in the territories and the new states to be formed therefrom, are to be left to the decision of the people residing therein, by their appropriate representatives." As this provision was directly contrary to the Missouri Compromise, Douglas introduced a second bill specifically declaring that measure "void and inoperative." The new bill became a law after a bitter struggle. It practically admitted slavery to an area of 500,000 square miles, embracing what is now Kansas, Nebraska, North Dakota, South Dakota, Montana, Wyoming, and part of Colorado; revived the bitter contention which had been checked by the Compromise of 1850; and hastened the War of Secession.

Related Subjects. The reader is referred in these volumes to the following related topics:

Compromise of 1850	Pierce, Franklin
Kansas (History)	(Administration)
Missouri Compromise	Squatter Sovereignty
War of Secession	

KANSAS RIVER. See **KANSAS** (Rivers).

KANSAS STATE AGRICULTURAL COLLEGE. See **KANSAS** (Education).

KANT, *kahnt*, **IMMANUEL** (1724-1804), a German philosopher, celebrated as an original thinker, and accounted by many the only modern philosopher who ranks favorably with Plato and Aristotle. He never traveled beyond a distance of sixty miles from his native town, Königsberg, Prussia, and his entire life was spent in academic work, as scholar, tutor, university official, and writer. His *Critique of Pure Reason*, which was published in 1781, is possibly the most important philosophical work of the last two centuries. In 1785 and 1788, he published works bearing on his ethical doctrine, and in 1790 a philosophical essay upon esthetics and upon the presence of design in nature, now but little read.

The philosophy of Kant cannot be given in the compass of a paragraph. He recognized perception from within—perception of the mind itself—as distinguished from the elements of experience and the perception of things. Time and space are *a priori* forms of

perceptive sense. Every effect, every change, must have a cause, said Kant; whereas Hume believed that we do not know that change must of necessity be.

The work of Kant may be said to be epoch-making; for it gathered up and integrated all the critical philosophy which had preceded it, and substituted a new and clearer method of treating the problems of thought. It presented new problems, and showed how they might profitably be solved. It is like a lens which brings rays of light to a focus and projects an image upon a screen. Only, in the case of Kant, the image is magnified and, indeed, created by the medium through which the ideas pass. See **PHILOSOPHY**.

KAOLIN, *ka' o lin*. On a high ridge in China, which the natives call *Kaoling*, is found a pure white clay, from which the Chinese make their celebrated porcelain and pottery ware. From the Chinese name of the hill this clay has been named *kaolin*. Kaolin is decomposed feldspar and contains silica, alumina, and water. It is usually white, when burned. It can be ground to a fine powder, and has been extensively utilized for making the highest grades of pottery and for filling the pores and making a smooth surface on paper. It is now mined in various parts of the world. The largest mines in Europe are at Cornwall, England, and the clay is also obtained in large quantities in France and Germany. In the United States, kaolin is obtained chiefly from Georgia, Pennsylvania, and North and South Carolina. See illustration, page 3747.

When taken from the mine, kaolin contains quartz and other impurities which are separated from it by mixing with water in large settling tanks. When the impurities fall to the bottom, the kaolin is drawn into other tanks and allowed to settle. It is then dried and cut into cakes. See **POTTERY**; **CLAY**. A.N.W.

Chemical Formula. The formula for kaolin is $H_4Al_2Si_2O_9$; that is, a molecule contains four atoms of hydrogen, two of aluminum, two of silicon, and nine of oxygen.

KAPOK, *kah' pahk*. See **JAVA**.

KARAFUTO, *kah ra foo' toh*, the name given by the Japanese to their part of Sakhalin Island (which see). See, also, **JAPAN** (Location and Size).

KARAKORAM, *kah rah' ko' rum*, **MOUNTAINS**. See **HIMALAYA**.

KARAKUL, *kahr' a kool*, **SHEEP**, a breed of sheep whose native home is Bokhara, a part of Soviet Russia in Central Asia. They are narrow-backed animals, of spare flesh, and are valuable chiefly because the pelt of the lambs is suitable for making fur muffs, caps, and garments. The fleece of the young lambs remains lustrous, black, and curly until the lambs are five days old, after which it



Photo: Visual Education Service

KAOLIN MINE IN NORTH CAROLINA

assumes a brownish color. At maturity, Karakul wool is coarse and gray. In the market the lambskins are sold as Persian lamb, and they are highly prized because of their beauty.

lamb is the fleece of very young Astrakhan lambs. The Persian lynx (*Felis caracal*), a small brownish flesh-eating animal of Asia and Africa, is also called caracal.]

KARA, *kah' rah*, **SEA**. See **SIBERIA** (Rivers and Lakes).

KARAT. See **CARAT**.

KARL FRANZ JOSEPH (Charles I), youthful successor of the aged Francis Joseph as ruler of Austria-Hungary during the World War. See **AUSTRIA** (History); **AUSTRIA-HUNGARY** (History); **WORLD WAR**; **CHARLES I**.

KARLSBAD. See **CARLSBAD**.

KARLSRUHE, *kahr's' roo eh*. See **GERMANY** (Principal Cities).

KARNAK, *kahr' nahk*, **EGYPT**. See **EGYPT** (Ancient Cities).

KAROLYI, *kah' ro lye*, **MICHAEL**. See **HUNGARY** (History).

KARST, **THE**. See **YUGOSLAVIA** (Physical Features).

KASBEK PEAK. See **CAUCASIA** (The Caucasus Mountains).

KASHGAR, *kash' gahr*. See **SIN-KIANG**.

KASHMIR, OR **CASHMERE**, *kash meer'*, noted as the place of manufacture of the famous Cashmere shawls, and called by the Asiatics "the Paradise of India," is an extensive principality in Northwestern India. It is subject to a ruler belonging to the Sikh



Photo: Visual Education Service

KARAKUL EWE AND LAMB

Several hundred Karakul sheep have been brought to the United States, where they have been crossed with long-wooled breeds. W.N.H.

[The name *caracul* or *caracal* is applied to various grades of fur obtained from goats and sheep. Caracul

race, but politically is subordinate to the British Indian Empire. The area, estimated at 84,000 square miles, is composed of various provinces or districts, of which Kashmir proper is the most famous and interesting. It is a valley surrounded by the gigantic Himalaya and the Hindu Kush mountains, and is traversed by the River Jhelum. Ten passes lead through the mountains into this valley, varying in height from about 9,000 to 12,000 feet.

Despite the cold climate, due to the valley's elevated situation and the snow-crowned mountains which surround it, the region is very fertile and is well watered. Forests on the slopes, fields of corn, rice crops along the sides of the rivers, rich orchards, and an abundant growth of flowers and fruits have rendered this district famous; indeed, the valley is noted for its roses and jasmine, and the extracted oil from these and other flowers forms an important article of export. Attention now is being given to the culture of the vine. Srinagar, the largest town and the summer residence of the native ruler, or maharaja, was founded in the sixth century, coming under British protection in 1846. Population of the principality, over 3,320,000, chiefly Mohammedan.

Cashmere Shawls, once a treasured possession in women's wardrobes the world over, are made from the inner wool of the wild goat. The shawls are woven or embroidered by hand in stripes, and afterward skilfully sewed together, and their patterns have remained unchanged down the ages. During the early years of the nineteenth century, the manufacture of an imitation of Cashmere shawls was begun in Europe, particularly at Paisley, Scotland, where a pure-wool shawl was made which became a rival of the true Cashmere shawl and caused its decline in the world's markets.

KASKASKIA. See ILLINOIS (History).

KATABOLISM, *ka tab' o liz'm*. See METABOLISM.

KATAHDIN, *ka tah' din*, from the Indian word *Ktaadn*, meaning *big mountain*, is a prominent peak of the Appalachian Mountains, and the highest mountain in Maine. It is well described by Thoreau in his *Maine Woods*. The peak is 130 miles northeast of Augusta, in the central part of the state, and has an altitude of 5,385 feet. The sides of the mountain are composed of granite and bear glacial scratches produced during the last ice age; on its summit are found only mosses and lichens and a few stunted plants. It is located in the midst of a wilderness, the Penobscot River being the best means of access to the region. A panoramic view of the surrounding country is obtained from its summit. See MAINE (The Land).

KATMAI, *kaht' mi*, **MONUMENT.** See MONUMENTS, NATIONAL.

KATRINE, *kat' rin*, locally called **LOCH KATRINE**, is a picturesque lake in the Lowlands of Scotland, whose beauty has been immortalized by Scott's poem, *Lady of the Lake*. Along its banks is some of the most beautiful scenery of Great Britain, delightfully varied in its combination of forest, lake, river, and mountain. The lake is about nine miles long and two miles wide, and is one of the most frequented of the numerous lakes which occupy the deep hollows within the mountain valleys. See SCOTLAND (Rivers and Lakes).

KATTEGAT, *kat' te gat*, a strait forming one of the connecting links between the Baltic and the North seas. (By authority of the



LOCATION MAP

Geographic Board, 1920, the foregoing spelling is considered preferable to CATTEGAT.) The strait is situated between Sweden and Denmark, and is 150 miles long and ninety miles wide. Because of its numerous shoals and frequent storms, navigation is dangerous. The eastern shores are steep and rocky, but the western are low. On the three important islands, Läsö, Anholt, and Samsö, the fisheries are valuable.

Derivation of the Name. The word *Kattegat* is derived from the Scandinavian for *cat's throat*.

KATYDID, the popular name of several species of large, long-horned, greenish insects related to the meadow grasshoppers. The name refers to the love call of the males, which resembles the three syllables *ka ti did* repeated over and over again. These notes the katydids produce by rubbing together the bases of their front wings, on which are little cross-ridges that form a sort of scraper. The "song" begins at twilight and is kept up with little interruption throughout the night. It is heard most

frequently in the late summer and autumn. Not all species produce the syllables mentioned, but they are the ones most frequently heard. Most katydids live in trees and shrubs; they feed on leaves and young twigs, but the damage



I love to hear thine earnest voice,
Wherever thou art hid,
Thou testy little dogmatist,
Thou pretty Katydid!
Thou mindest me of gentlefolks,—
Old gentlefolks are they,—
Thou say'st an undisputed thing
In such a solemn way.

HOLMES: *To an Insect.*

The illustration shows a katydid, one leg, disclosing location of ear, and a leaf, with egg cluster along its edge.

they do is inconsiderable compared to the ravages of numerous other insects. Sharp eyes should be able to distinguish their oval, flattened, slate-gray eggs, which are laid on the edges of leaves and on the twigs of trees, in double overlapping rows, early in the fall and at intervals until the frost appears. In the spring, the egg splits along the edge and the small katydid appears.

w.j.s.

Classification. Katydids belong to the family of insects that is scientifically called *Locustidae*, but the insects popularly known as locusts are not included in this group (see LOCUST; GRASSHOPPER). Common and well-known species among the katydids are the broad-winged, *Cyrtophyllus concavus*, and the angular-winged, *Microcenotum laurifolium*.

KAUAI, *kah oo-ah'e*, one of the Hawaiian Islands. See HAWAII.

KAULBACH, *kaul'-bahK*, WILHELM VON (1805-1874), one of the leaders of the modern German school of art, whose fame rests on his cycle of paintings depicting the progress of civilization in typical scenes from the great his-

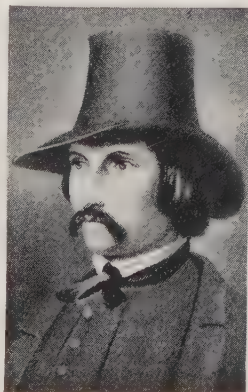


Photo: Brown Bros.

KAULBACH

toric periods. The series, which embraces six colossal compositions, decorates the walls of the vestibule of the Berlin Museum, and includes *The Tower of Babel*, *The Glorious Age of Greece*, *The Destruction of Jerusalem*, *The Battle of the Huns*, *The Crusaders before Jerusalem*, and *The Age of the Reformation*. Kaulbach was born at Arolsen, Westphalia, and first studied at the Düsseldorf Academy of Arts under Cornelius, whom he followed to Munich. From 1849 to the day of his death, he was director of the academy of painting in that city. His last gigantic painting is *The Sea Fight of Salamis*, in the Munich Gallery. He also made many illustrations for the works of Goethe, Schiller, and Shakespeare, and painted many portraits.

KAUNITZ, *kou' nits*, WENZEL ANTON DOMINIK, Prince (1711-1794), for some years the youngest member of the Cabinet of Maria Theresa of Austria. Fitted by education and travel for diplomacy, he entered the service of Charles VI while still a young man. Though he was always in poor health, he was the clearest of thinkers and one of the ablest diplomats of his day. He was a real patriot, and it was the realization of this quality that gave him Maria Theresa's complete trust; she invariably supported his policies. His greatest diplomatic victory was the winning of France to sign the Treaty of Versailles against Frederick the Great, in May, 1756. After the death of Maria Theresa, in 1780, his power in the state steadily declined; in 1792 he resigned, and two years later he died. See MARIA THERESA.



KAUNITZ

From a medallion.

KAURI, *kou' rie*, GUM. See NEW ZEALAND (Industries).

KAWEAH, *kah we' ah*, PEAK. See CALIFORNIA (Surface Features).

KAY, JOHN. See POET LAUREATE.

KAYAK, *ki' ak*, the Eskimo fishing boat. See ESKIMO.

KAZAN, *kah zahn'*. See RUSSIA (Principal Cities).

KEA, *ka' ah*, or *ke' ah*. See PARROT.

KEAN, *keen*, the family name of two actors known in their day on the American and European stage as the greatest impersonators of Shakespearean characters. Coleridge, the English poet, said of Edmund Kean that "seeing him act was like reading Shakespeare by flashes of lightning."

Edmund Kean (1787-1833), the first of the name to achieve fame, was born in London, the son of a strolling actress and a stage carpenter. When twelve years old, he joined a company of wandering players with his mother. In 1808 he was married, and his family often went hungry, until 1814, when his portrayal of Shylock in *The Merchant of Venice*, at Drury Lane Theater, London, made his fame assured. He toured the United States and Canada twice.

Charles John Kean (1811-1868), second son of Edmund Kean, was born at Waterford, Ireland, and educated at Eton. In 1827, as young Norval in *Douglas* at Drury Lane, he made his first appearance with but trifling success. He visited America in 1830 and soon became popular. Later, with his father in the title rôle of Othello, Charles played Iago, but his best interpretation was that of the character of Hamlet. He married Ellen Tree in 1842, and they acted together until his death. His management of the Princess Theater in London was celebrated for splendid productions of *Hamlet*, *Macbeth*, *The Tempest*, and other Shakespearean plays.

KEARNY, kahr' nie, N. J. See NEW JERSEY (back of map).

KEARNY, PHILIP (1815-1862), an American soldier whom the state of New Jersey has honored with a statue in Statuary Hall, Washington, D. C. Born in New York City, he was graduated from Columbia University, and subsequently studied law. In 1837 he entered the United States army as lieutenant. He resigned in 1846, and immediately reenlisted for service in the Mexican War, where his bravery earned him a brevet of major. In 1859 he enlisted in the French army. At the outbreak of the War of Secession, Kearny returned to the United States army with the rank of brigadier general. For some time he commanded the First New Jersey Brigade, and in 1862 was placed in command of the Army of the Potomac. In July of that year, he was commissioned major-general of volunteers. He was killed at the Battle of Chantilly. His statue was placed in Statuary Hall in 1888. See STATUARY HALL.

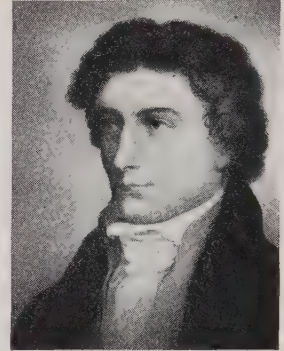
KEARSARGE, keer' sahrj, an American warship. See ALABAMA, THE; SEMMES, RAPHAEL.

KEATS, JOHN (1795-1821), the last of the English Romantic poets. "A thing of beauty is a joy forever," he wrote in one of his early poems, and the line is a household phrase today. Yet this gifted poet, dying in his twenty-sixth year, felt that his work had made so slight an impression that he wrote as his own epitaph—"Here lies one whose name was writ in water."

Few biographies are more pathetic than the record of his brief life. Born with an intense love of all things beautiful, he was the son of a London stable-keeper, and for many years had little opportunity to do the things for which he was fitted. His father sent him to a private school at Enfield for his early schooling. Both parents died while he was still a boy, and at the age of fifteen, his guardians

placed him under training to a surgeon of Edmonton. After serving as an apprentice for five years, he spent two more years as a hospital assistant.

The great change in his life came through his reading of Spenser's *Faerie Queene*, the music of which enchanted him. Abandoning surgery, Keats published his first volume of poems in 1817, and a year later he issued a second volume entitled *Endymion*.



Photos: Brown Bros.; Topical Press Agency, London

JOHN KEATS

Dying in early manhood, he little realized the great and imperishable renown that was to be his. One of his last conscious acts was to dictate this epitaph for his tomb: "Here lies one whose name was writ in water." The building is the Keats home at Hampstead, now a museum dedicated to the poet.

Savage criticism greeted these early ventures of Keats, and when, after the appearance of his third and last book, in 1820, his health failed, his friend Shelley bitterly censured the reviewers for crushing the spirit of the sensitive young poet. Shelley's great elegy, *Adonais*, is, in fact, based on the idea that the early death of Keats was due to the sharp criticism of the reviews. The truth is that the three years of writing had seriously undermined the constitution of the poet, who was never robust, and Shelley's poem is more emotional than accurate.

Keats sought the restoration of his health in Italy, but the struggle was vain, and in February, 1821, he died of consumption at Rome. His grave and headstone, with the melancholy epitaph engraved upon it, may be seen in the Protestant cemetery there, near the resting place of Shelley.

His Place in Literature. The first two volumes of verse that Keats produced revealed his splendid



AND THEY ARE GONE: AY, AGES LONG AGO
THESE LOVERS FLED AWAY INTO THE STORM.

— KEATS: *Eve of Saint Agnes*

promise, but his early poems have not the finish that came with the ripening of his powers. *Endymion*, the story of the young shepherd who is loved by a moon goddess, is too ornate, and therefore is inferior to his last collection, to which he gave the title *Lamia, Isabella, The Eve of Saint Agnes, and Other Poems*. The reader who delights in word painting that is akin to the sweetest music will find none lovelier in English literature than that in the last writings from the pen of Keats. They give him true claim to the title "the poets' poet." The pure melody and lyric beauty of his work profoundly influenced Tennyson, Rossetti, Swinburne, and others of the Victorian Age.

Keats was the only one of the Romantic poets of his own period (see ROMANTICISM) who was interested in art alone; he was neither a reformer nor a moralist. Beauty and truth were to him one and the same, and the spirit of his work is well illustrated in the opening lines of *Endymion*:

A thing of beauty is a joy forever;
Its loveliness increases; it will never
Pass into nothingness; but still will keep
A bower quiet for us; and a sleep
Full of sweet dreams, and health, and quiet breathing.

KEBLE, JOHN (1792-1866). See OXFORD MOVEMENT.

KEDESH, *ke' desh*, one of the Cities of Refuge (which see).

KEDRON, VALLEY OF. See JERUSALEM.

KEEL-BACKED LIZARD. See IGUANA.

KEELEY, LESLIE (1836-1900), an American physician who gained fame as the promoter of a cure for the alcohol, opium, and morphine habits. His remedy was chloride of gold and sodium, known as the "gold cure." Dr. Keeley originally engaged in the practice of medicine in Dwight, Ill., but gave it up to devote his entire time to the cure of drunkenness. He was the son and the grandson of physicians who had studied alcoholism and its effects, and he became interested in the subject very early in life. He began his experiments in search of a cure for intemperance while he was a surgeon in the Federal army, in 1862. In 1880 he established a sanitarium at Dwight, and later carried on the work in other cities. Although his treatment cured many cases of inebriety, its effects were not always permanent.

KEENE, LAURA (about 1820-1873), an English actress and theatrical manager whose real name was MARY MOSS. She became famous in London, in 1851, as Pauline in *The Lady of Lyons*. The following year she moved to the United States, where she spent the remainder of her life. The most noted play under her management was *Our American Cousin*, which was brought out in 1858 with Jefferson and Sothorn among the supporting actors. During a performance of this play, at Ford's Theater, Washington, President Lincoln, an interested spectator, was assassinated (1865).

KEENE, N. H. See NEW HAMPSHIRE (back of map).

KELLER, HELEN ADAMS (1880-), an American writer and lecturer, who, although blind and deaf from babyhood, has been able to share in the activities of a normal life. Miss Keller was born in Tuscumbia, Ala. A serious illness before she was two years old destroyed both sight and hearing, and for years her power of speech was dormant. When Helen was eight years of age, her parents brought Miss Anne Sullivan (Mrs. John A. Macy) from the Perkins Institution for the Blind, in Boston, to their home in Alabama, and the child was taught the deaf and dumb language by touch, and to read by feeling raised points which represent letters [see BLINDNESS (Education of the Blind)].



HELEN KELLER

A special typewriter was made for her use, by which she did all her writing. Later, she was also taught to talk, though imperfectly; the power of correct speech was, however, developed in time, and to-day Miss Keller is able to interest large audiences in her lectures. Not only has she mastered the English language, but French and German, as well. She "reads" and writes these foreign languages with ease.

Miss Keller attended the Wright-Humason and the Cambridge schools in Boston before entering Radcliffe College, where, in 1904, she was graduated with honors. During all these years, Miss Sullivan was her constant companion, attending all her classes with her, and repeating, by means of hand language, the lectures and class discussions as they were given.

Some of Her Activities. Since her graduation from college, Miss Keller has contributed articles to *The Century*, *McClure's Magazine*, *The Youth's Companion*, and *The Ladies Home Journal*. Her longer writings include *Story of My Life* (an autobiography), *Optimism*, *The World I Live In*, *The Song of the Stone Wall*, *Out of the Dark*, and *Midstream*, a continuation of the story of her life. She has been a member of several commissions serving in the interests of schools for the deaf and dumb and blind, has traveled, and has lectured on subjects of present-day interest.

[One of the finest tributes ever paid to Helen Keller is Madame Maeterlinck's *The Girl Who Found the Bluebird*, which she wrote after a visit to the blind girl.]

KELLOGG, *kel' og*, CLARA LOUISE (1842-1916), an American dramatic soprano, born at Sumterville, S. C. The greater part of her musical education was received in New York, but it was completed abroad. Her first rôle to receive enthusiastic applause was that of Marguerite in *Faust*; later, she was equally successful in other rôles, her dramatic powers and singing receiving high recognition. She organized an English and an Italian opera company, in both of which many famous singers won their first laurels. She was the first American singer to win European recognition. In 1887 she married Carl Strakosch and retired from the stage. Madame Kellogg's autobiography, *Memoirs of an American Prima Donna*, was published in 1913.

KELLOGG, FRANK B. See COOLIDGE, CALVIN (Foreign Affairs).

KELLOGG-BRIAND PEACE TREATY. See RENUNCIATION OF WAR, GENERAL TREATY FOR.

KELLY, WILLIAM, inventor of a process of steel manufacture later credited to Sir Henry Bessemer (which see). See, also, IRON AND STEEL.

KELP, the alkaline ash obtained by burning certain seaweeds of the same name, found on the coasts of Ireland, Scotland, and Brittany. It is an important source of iodine, the amount obtained varying from four to fifteen pounds to the ton. About twenty-five per cent of kelp is potassium chloride. Common salt, sodium carbonate, sodium and potassium sulphates, and potassium or sodium iodide are also present. Formerly, the crude alkali obtained from the ash was used in soap-making, but cheaper processes are now employed. Kelp plants, partially dried, are used as a fertilizer. Extensive groves of giant kelps, an allied species, are found on the Pacific coast of America. These kelps were exploited as a source of potash during the World War, but after the resumption of trade relations with Germany, commercial development of the seaweeds was largely abandoned. See SEAWEED; ALGAE. T.B.J.

KELVIN, BARON (1824-1907), a British scientist and mathematician, whose baptismal name was WILLIAM THOMSON. He was born in Belfast, Ireland. After his graduation from Cambridge University, in 1845, he went to Paris and spent a year in the physical laboratory of the celebrated scientist, Henri Regnault. In 1846, when twenty-two years of age, Thomson accepted the chair of natural philosophy in the University of Glasgow, a position which he held with the greatest distinction for fifty-three years. He was the first editor of the *Cambridge and Dublin Mathematical Journal*, and in this publication appeared accounts of many of his greatest discoveries. He was knighted in 1866, and in 1892 was raised to the peerage, receiving the title of

Baron Kelvin of Largs. British, French, and German scientific organizations conferred upon him the highest honors, and the jubilee anniversary of his professorship was celebrated in 1896 by a splendid gathering of great scientists from all countries.

Lord Kelvin was the electrical engineer for the promoters of the Atlantic cable; his connection with this enterprise led to his invention of the mirror galvanometer (which see), used in cable signaling, and he also devised the siphon recorder, which is still employed for



Photo: Brown Bros.

LORD KELVIN

receiving the signals. He invented many pieces of electrical apparatus and improved the mariner's compass, freeing it largely from the magnetic action of the iron of the ship. He made discoveries in every field of energy—sound, light, heat, magnetism, and electricity (see each of these titles in these volumes). Lord Kelvin published more than three hundred original papers covering the vast field of his scientific discoveries, and with Professor Tait wrote the very important *Treatise on Natural Philosophy*.

KEMAL, MUSTAPHA, *mus tah' fah ke mahl'* (1880-), the military leader and organizer of the National State of Turkey, and its first President. By ancestry he is a Spanish Jew, but by birth and breeding a Moslem, for he was born in European Turkey (Macedonia) and educated in Constantinople. He displayed great military ability when in the Turkish Military School, and chose the army for his career.

When Turkey joined Germany in the World War, Kemal was sent to oppose the British at Gallipoli, where the latter met disaster. Distrust and jealousy on the part of his superiors sent him to a supposedly unimportant command in Anatolia, but there he drove out the Greeks and became master of the peninsula. Incensed because the great powers after the war were prepared to divide Turkey among them, he threatened the neutral zone around Constantinople and exacted a new treaty, at Lausanne, Switzerland, in 1922, which saved Turkey to the Turks.

Kemal found himself master of Turkey. The sultan in Constantinople was powerless to avert the organization of a republic, and when Kemal proclaimed the National State of Turkey, the sultan was dethroned and fled to Switzerland. The caliphate, for centuries

centered in the sultan, was abolished (see CALIPH AND CALIPHATE). Constantinople was abandoned as the capital of the new state, and Ankara (until 1929 Angora) became the



Photo: O R O C

MUSTAFA KEMAL

The strong man at the head of affairs in the new National State of Turkey.

seat of government. In 1922 it was a dirty village of 15,000 people; within four years it had a population of 100,000.

Kemal was master of the National Assembly, and it elected him President of the National State. Besides abolishing many traditional customs, he instituted many reforms. Women were accorded Western freedom; the fez, headwear of men for a thousand years, was supplanted by the hat of the European; the harem was abolished, and divorce by word of mouth made unlawful and placed under the courts; in the future, no man could have more than one wife, though existing plural marriages were not disturbed. Within six years after he began to mold the new state, more was accomplished in the way of reform than the nation had witnessed in the preceding six centuries. In 1928 Kemal ordered the substitution of English letters for the old Arabic characters. See LAUSANNE, TREATY OF; TURKEY (History).

KEMBLE, FRANCIS ANNE (1809-1893), an actress and author, better known as FANNY KEMBLE. She made her first appearance on the stage in 1829 at Covent Garden, London, as Juliet, and later was successful as Portia in *The Merchant of Venice* and Lady Teazle in Sheridan's *School for Scandal*. Had it not been for the financial troubles of her father, she would probably have been celebrated only as a clever writer, for she looked upon the theater simply as a means for earning money. After a successful trip to America with her father, she returned to London, in 1847, and from that time made her home alternately in America, England, and on the Continent.

Her Writings. Her *Record of a Girlhood* chronicles her earlier success. At eighteen she wrote a clever but immature drama which showed intellectual vigor. Later, she wrote a tragedy, *Francis the First*, and a book of poems.

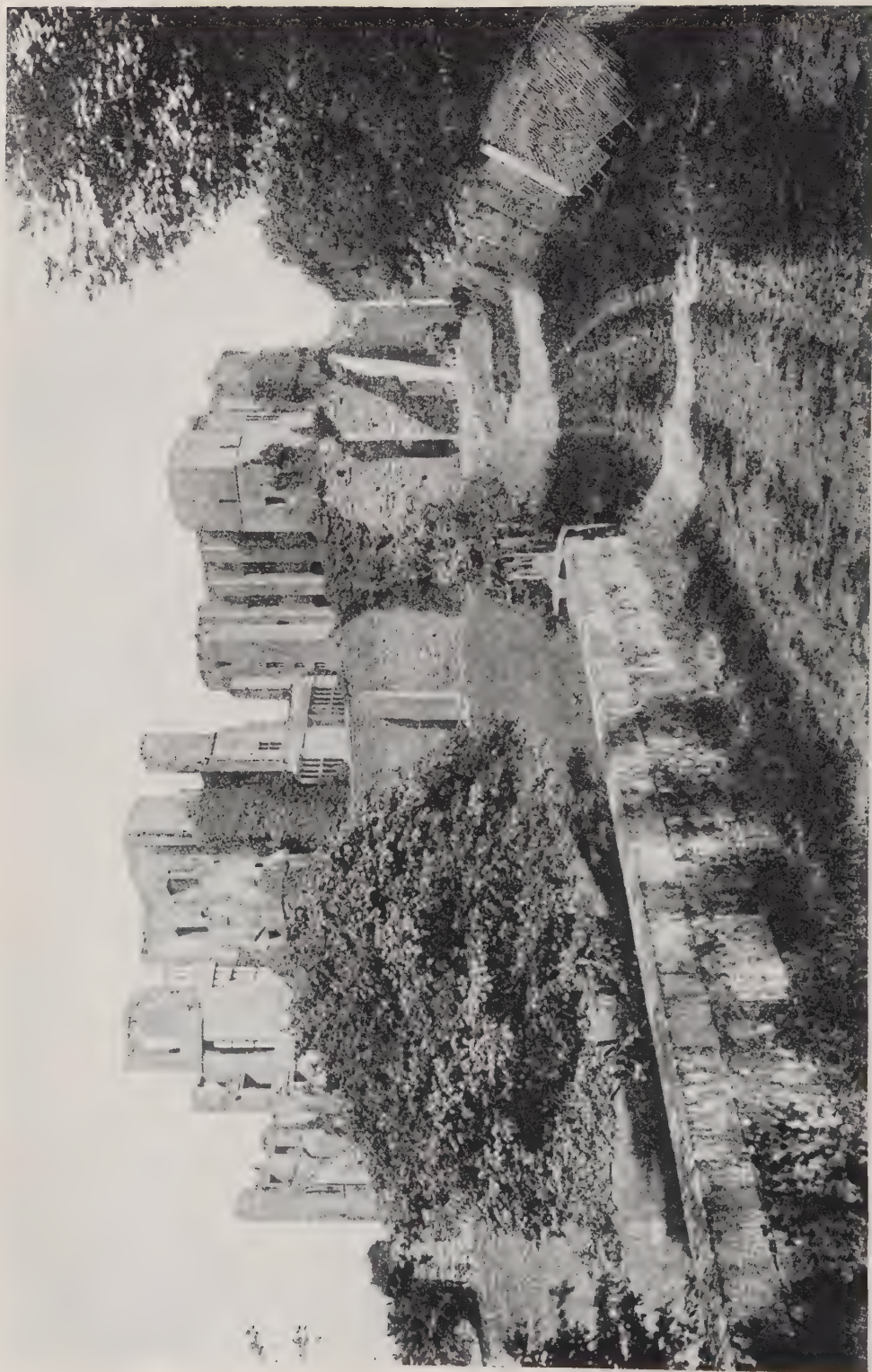
KENAI, *keh ni'*, **PENINSULA**, a projection from the southern part of Alaska (which see).

KENDALL, AMOS (1789-1869), an American statesman and political leader who served as Postmaster-General during the administrations of Presidents Jackson and Van Buren. He was born at Dunstable, Mass., and for several years acted in the capacity of tutor in the family of Henry Clay, in Kentucky. Later, he was admitted to the bar. After Jackson's election to the Presidency, he became a leading figure in the famous "Kitchen Cabinet" (see KITCHEN CABINET), and was influential in shaping the policies of the administration. President Jackson made him an auditor in the Treasury Department and later Postmaster-General, and in the latter office he was continued by President Van Buren. Of several improvements in the postal service, due to his initiative and good judgment, the money-order system is most important. Kendall edited several newspapers. During his last years, he devoted himself to many philanthropic enterprises, for he had amassed a great fortune through his investments with Samuel F. B. Morse in telegraph patents. He wrote a *Life of Jackson* and an *Autobiography*.

KENESAW MOUNTAIN, BATTLE OF. See WAR OF SECESSION.

KENIA, *ka' ne ah*, MOUNT. See AFRICA (Surface).

KENILWORTH, a town of England, in Warwickshire, four miles north of Warwick, with about 5,000 population. Its chief attraction is its magnificent ivy-covered ruin, the famous Kenilworth Castle. This historic building, founded in the reign of Henry I, and destroyed by Cromwell's forces, formed the setting for many notable events in English history, as well as the background for Sir Walter Scott's novel, *Kenilworth*. See illustration, page 3754.



Scott founded his romance on Mickle's ballad of *Cumnor Hall*, which tells the tragic story of Amy Robsart, the martyred wife of Queen Elizabeth's favorite, the Earl of Leicester. Queen Elizabeth, Sir Walter Raleigh, Shakespeare, and other historical personages are introduced, and elaborate descriptions are given of the queen's visit to the castle and the gorgeous entertainment given there for her by the Earl of Leicester, to whom the castle was presented. The festivities continued for nineteen days, and were characterized by every sort of wasteful extravagance possible at that age. The property is now a favorite scenic spot for tourists. It may be visited in a one-day tour of the Shakespeare country, starting from London.

KENNA, JOHN EDWARD (1848-1893), United States Senator from West Virginia, born near Saint Albans, Va. (now West Va.). When sixteen years of age, he enlisted in the Confederate army in the War of Secession. Later, he studied law, and was admitted to the bar in 1870, commencing practice in Charleston, West Va. Kenna was a member of the House of Representatives from 1877 to 1883, and served as Senator from 1883 until his death, in 1893. In 1901 his statue was placed in Statuary Hall, in Washington, D. C. See STATUARY HALL.

KENNAN, *ken' an*, GEORGE (1845-1924), an American author and lecturer, celebrated for his investigations of the Siberian exile system. He was born in Norwalk, O., was educated at Williams College, studied telegraphy, and became manager of a telegraph office in Cincinnati. From 1865 to 1871, he was construction engineer of the Russo-American Telegraph Company in Siberia, and during this period he was greatly stirred by what he heard regarding the exile system. Subsequently, he investigated conditions of the convict system of Siberia, making a journey of over 15,000 miles, and visiting mines and prisons. His lectures on his Siberian experiences, delivered after his return to America, led to his expulsion from Russia in 1901, when he again visited that country. Kennan served as war correspondent during the Spanish-American war, in 1898, and during the Russo-Japanese War, in 1904 and 1905, and embodied his experiences and conclusions in lectures and in articles for various magazines.

Kennan's Writings. His published works include *Siberia and the Exile System*; *Campaigning in Cuba*; *The Tragedy of Pelée*, a work dealing with the eruption of Mount Pelée, in Martinique (which see); *A Russian Comedy of Errors*; *The Salton Sea*; and *E. H. Harriman, a Biography*.

KENNEBEC, *ken' e bek*, **RIVER**, one of the principal waterways of Maine, rising in Moosehead Lake and flowing south into the Atlantic Ocean. Because of its fall of over one thousand

feet from source to mouth, it furnishes water power to the cities on its banks, among which is Augusta, the capital of the state. The Kennebec is between 150 and 160 miles in length, and is navigable for large ships for about twelve miles above its mouth. See MAINE (Lakes and Rivers).

KENNEDY, WILLIAM P. M. See CANADIAN LITERATURE (English Canada: History and Biography).

KENNETH SAWYER GOODMAN THEATER. See DRAMA (Modern Tendencies); CHICAGO (Ill.).

KENNISON, DAVID, the last survivor of the Boston Tea Party. See that article, for illustration of a tablet erected to his memory.

KENOSHA, *ke no' shah*, WIS., the county seat of Kenosha County, is a manufacturing city situated on the shores of Lake Michigan, in the southeastern part of Wisconsin, eight miles from the Wisconsin-Illinois state line, thirty-three miles south of Milwaukee, and fifty-one miles north of Chicago. Population, 1928, 56,500 (Federal estimate).

The original settlement, known as Southport, was organized as a village in 1835; in 1850 it was incorporated as a city, having a population at that time of 3,437. The city-manager form of government was adopted in 1925.

Transportation. The Chicago & North Western Railway, the Chicago, North Shore & Milwaukee (electric), and an interurban line, as well as steamboat lines, trucks, and buses, connect the city with Chicago, Milwaukee, and all intervening and connecting points. Three state trunk highways of concrete, including the famous Sheridan Road, run into and out of the city.

Industry. The principal products are automobiles, trucks, auto specialties, metal beds and furniture, bed springs and mattresses, hosiery and underwear, plumbers' supplies, brass, copper, nickel, and silver castings and specialties, wood furniture, fire apparatus, athletic equipment, machine tools, and wire rope and cable, including airplane stream lines.

Education. The city has public schools, parochial schools, four junior high schools, and one senior high, outdoor and continuation schools, and Kemper Hall, a Protestant Episcopal school for girls. G.G.

KENT, JAMES (1763-1847), an American jurist, whose famous *Commentaries on American Law*, published between 1826 and 1830, has had a permanent influence upon American legal practice and legislative

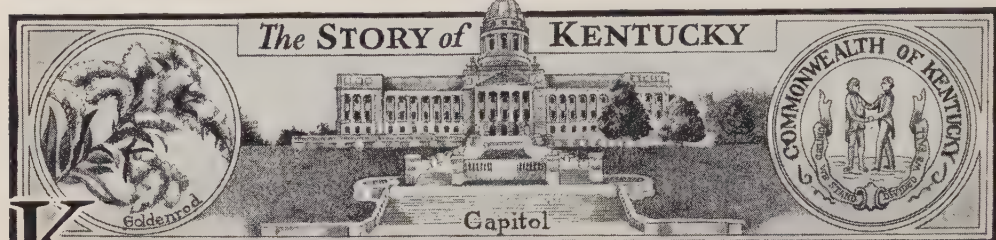


Photo: Brown Bros.

JAMES KENT

principles. Kent was born at Fredericksburg, N. Y. After his graduation from Yale College, in 1781, he studied law, and was admitted to the bar in 1787. In 1793 he became professor of law at Columbia College, and later rose

from justice of the supreme court of New York to be chancellor of the state. In 1823 he retired from the bench, but continued actively his private practice until a few years before his death.



KENTUCKY is one of the South-Central states of the American Union. Some people declare its name comes from a Cherokee Indian word which means *prairie*, or the *barrens*; others say that *Ken-ta-ke* was an Iroquois word meaning either *place of old fields* or *land of to-morrow*. To the pioneers it was a land for the future, well worth cherishing and one for which many of them fought and died.

Writing of his fellow Kentuckians, Irvin S. Cobb says that in 1831 the traveler, Timothy Flint, "found a race of proud optimists, an ardent, boastful, and enthusiastic breed, who made a religion of their politics and a creed of their hospitality."

That may have been true of Kentuckians a century ago, but to-day they are a people who recognize their needs and are going to work to get the things that will make the state more prosperous. A recent legislature created the Kentucky Progress Commission, and charged it with the responsibility for the development of the economic, industrial, and scenic resources of the state.

Size and Location. With an area of 40,598 square miles, of which 417 square miles are water, Kentucky ranks thirty-sixth in size among the states of the Union. It is very irregular in shape. (Irvin S. Cobb says his native state "is shaped like a camel lying down.") Its northern boundary is formed by the winding course of the Ohio River, which separates Kentucky from Ohio, and from its Midwest neighbors, Indiana, Illinois, and Missouri. Tennessee bounds the state on the south, while Virginia and West Virginia, to the east, link Kentucky to the Old South. Kentucky's greatest breadth, between the celebrated Cumberland Gap and Covington, on the Ohio, is 171 miles; while in the western end of the state the distance between the southern border and Paducah is only forty miles. Its greatest length from east to west is about 425 miles. Kentucky was the first district beyond the Allegheny Mountains to be settled, and

the second state admitted to the Union after the original thirteen, the first being Vermont.

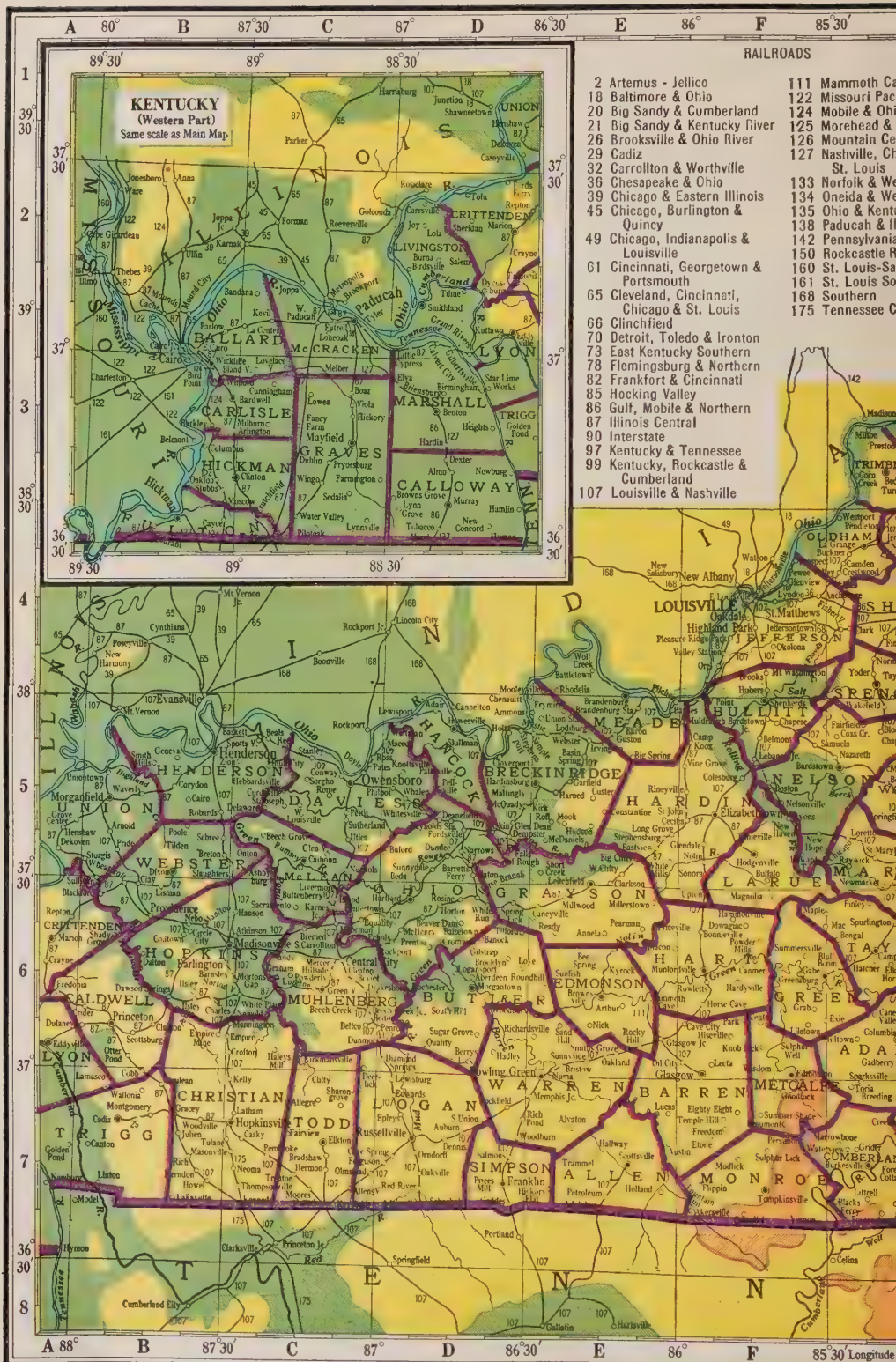
Its People. In the early days of the westward movement, Kentucky was a great "middle ground," unclaimed by any one tribe of Indians, but used by all. It was the *Warriors' Path*, over which, from north to south, rode the tribes intent on slaughter, and many fierce battles were waged in this region. Those settlers, therefore, who ventured to make homes upon this "dark and bloody ground," were men and women of dauntless spirit, for in those first years, crops were planted but seldom reaped, the rifle was a constant companion, and death from natural causes was almost unknown. From Pennsylvania, Virginia, North Carolina, Tennessee, they came, pioneered, settled, and sent forth pioneers to lands still farther westward. In population, Kentucky, with 2,416,630 inhabitants, ranked fifteenth among the states of the Union at the census of 1920. And with an average of sixty persons to the square mile, it also ranked fifteenth in density of population. Of the total population in 1920, 2,180,560 were whites, and 235,938, or almost one-tenth, were negroes. Kentucky, like most of the Southern states, has a small foreign-born population, amounting only to 1.4 per cent of the total; it is predominantly German. A little over one-fourth of the people live in towns and cities having a population of 2,500 or over.

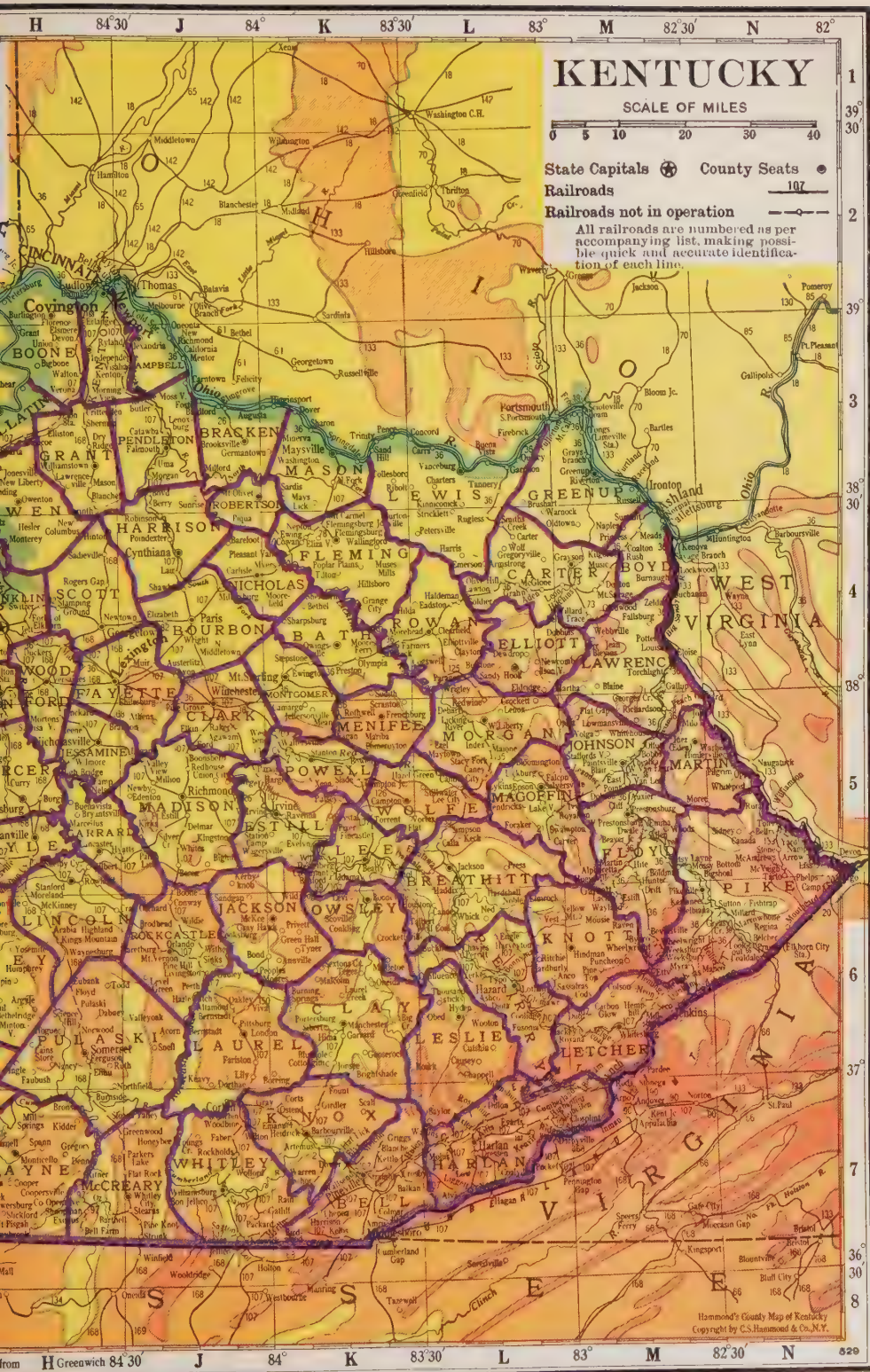
The chief cities are Frankfort, the capital; Louisville, the largest city in the state; Covington, Lexington, Newport, Paducah, Owensboro, Ashland, Henderson, Hopkinsville, Bowling Green, Middlesboro, Winchester, Paris, Somerset, Corbin, and Mayfield.

Religion. The Baptists are the strongest religious denomination, numbering about thirty-five per cent of the total population. The Methodists, Roman Catholics, and Disciples of Christ have about the same number of adherents, each including about twenty per cent of the population. The greater part of the re-

KENTUCKY

Aberdeen, (D6)...	100	Boone, (J5).....	100	Colson, (M6).....	100	Estill, (M6).....	300	Greenup, (M3)....	910
Acorn, (J6).....	100	Booneville, (K6)...	243	Columbia, (G6)...	1,076	Esto, (G6).....	100	Greenville, (C6)...	1,917
Adairville, (D7)...	778	Boonsboro, (J5)...	100	Columbus, (H3)...	654	Etowah, (F7).....	100	Greenwood, (J7)...	150
Adolphus, (E7)...	250	Boring, (K6).....	100	Concord, (L3)...	194	Etz, (M6).....	100	Grove Center, (A5)...	100
Albany, (G7).....	595	Boston, (F5).....	150	Confluence, (L6)...	100	Eubank, (H6).....	312	Guston, (E5).....	150
Alexandria, (J3)...	316	Boston, (J3).....	80	Conway, (J6).....	100	Evarts, (L7).....	502	Guthrie, (C7).....	1,160
Allegre, (C7).....	150	Bowen, (K5).....	150	Co-operative, (H7)...	100	Evelyn, (K5).....	150	Haddix, (L6).....	150
Allen, (M5).....	216	Bowling Green, (D6).....	9,638	Coopersville, (H7)...	100	Ewing, (K4).....	450	Haldeman, (L4)...	250
Allen, (C7).....	227	Bradford, (J3)...	150	Corbin, (J7).....	3,406	Exie, (G6).....	100	Halfway, (E7)...	150
Alno, (D3).....	200	Bradfordville, (G6)...	298	Corinth, (H3).....	211	Felz, (L5).....	124	Hammonville, (F6)...	100
Alpha, (G7).....	100	Brandenburg, (E5)...	503	Cornishville, (G5)...	300	Fagan, (K5).....	100	Hanson, (C6).....	160
Alpharetta, (M5)...	250	Breeding, (G6)...	140	Corydon, (B5)...	1,019	Fairfield, (G5)...	329	Hardin, (D3).....	436
Alton Station, (H4)...	150	Bremen, (C6).....	172	Cote Brillante, (J2)...	489	Fairview, (C7)...	250	Hardinsburg, (D5)...	810
Alva, (L7).....	200	Briensburg, (D3)...	57	Coxs Creek, (G5)...	57,121	Falcon, (L5).....	100	Hardshell, (L6)...	100
Alvaton, (E7).....	150	Bristow, (E6).....	150	Crab Orchard, (J6)...	493	Fallsburg, (M4)...	87	Hardy, (N5).....	521
Amnias, (D5).....	100	Brodhead, (J6)...	555	Crayne, (A6).....	100	Falls of Rough, (D5)...	200	Hardyville, (F6)...	250
Anchor, (K7).....	100	Bronston, (H7)...	736	Creelsboro, (G7)...	100	Falmouth, (J3)...	1,330	Hargett, (K5).....	100
Anchorage, (G4)...	447	Brooklyn, (D6)...	110	Crestwood, (G4)...	160	Fancy Farm, (C3)...	438	Harlan, (L7).....	2,647
Anco, (L6).....	150	Brooklyn, (D6)...	100	Crider, (H6).....	100	Farmers, (K5)...	316	Harned, (E5).....	200
Annetta, (E6).....	150	Brooks, (F1).....	100	Crittenden, (H3)...	185	Farmington, (C3)...	150	Hartrodsburg, (H5)...	3,765
Anaville, (K6).....	100	Brooksville, (J3)...	585	Crockettsville, (K6)...	200	Faubush, (H6)...	150	Hartford, (D6)...	960
Argyle, (H6).....	150	Brownsville, (E6)...	294	Crofton, (C6).....	527	Fergusson, (H6)...	529	Hawesville, (D5)...	829
Arlington, (C3)...	668	Bryantsville, (H5)...	204	Cromwell, (D6)...	100	Fincastle, (K5)...	150	Hazard, (L6).....	4,348
Arnspring, (L4)...	150	Buchanan, (M4)...	201	Cropper, (G4)...	250	Finchville, (G4)...	100	Hazel, (D4).....	415
Arte nus, (K7)...	200	Buckhorn, (L6)...	200	Crutchfield, (C4)...	111	Finley, (G6).....	100	Hazel Green, (L5)...	300
Arthur, (E6).....	150	Buenavista, (H5)...	100	Cumberland, (L7)...	300	Firebrick, (L3)...	100	Hebbardsville, (C5)...	370
Asburyburg, (C5)...	250	Buffalo, (F5).....	350	Cumberland City, (H7).....	150	Fishtrap, (N6)...	150	Heidelberg, (K5)...	250
Ashcamp, (N6)...	100	Bufo, (D5).....	100	Cunningham, (C3)...	250	Flat, (K5).....	100	Heidrick, (K7)...	200
Ashland, (M4)...	14,729	Burgin, (H5).....	713	Curdsville, (C5)...	210	Flat Gap, (M5)...	200	Heights, (D3)...	130
Askin, (D5).....	150	Burkville, (G7)...	798	Custer, (E5).....	100	Flat Lick, (K7)...	250	Hellier, (N6).....	1,884
Athens, (J5).....	197	Burkley, (B3).....	188	Cutshin, (L6).....	100	Fleming, (M6)...	2,069	Henderson, (C5)...	12,169
Auburn, (D7).....	715	Burlington, (H2)...	198	Cynthiana, (J4)...	3,857	Flemingsburg, (K4)...	1,562	Hendricks, (L5)...	100
Augusta, (J3).....	1,820	Burning Springs, (K6)...	100	Burnside, (H7)...	1,078	Flippin, (F7)...	200	Henshaw, (A5)...	200
Austin, (E7).....	100	Butler, (J3).....	406	Danville, (H5)...	5,099	Florence, (H2)...	268	Herdon, (B7)...	150
Auxier, (M5).....	400	Byron, (M6).....	500	Dawson Springs, (B6).....	1,762	Forker, (L5)...	100	Hesler, (H4).....	150
Bagdad, (G4).....	250	Cadiz, (B7).....	897	Dayton, (J2).....	7,646	Ford, (J5).....	250	Hickman, (C4)...	2,633
Balazetown, (D6)...	100	Cains Store, (H2)...	100	Deaneville, (D5)...	80	Fordsville, (D5)...	612	Hickory, (B3)...	205
Balkan, (K7).....	150	Cairo, (B5).....	100	Defoe, (G4).....	150	Ford Forest Cottage, (G7)...	100	High Bridge, (H5)...	200
Balls Landing, (H3)...	100	Calhoun, (C5)...	743	Dekoven, (A5)...	655	Forks of Elkhorn, (H4).....	150	Highland Park, (F4).....	3,979
Bandana, (C2).....	286	California, (J5)...	146	De Moss, (J5)...	250	Fort Mitchell, (H2)...	169	Highway, (G7)...	100
Barbourville, (K7)...	1,877	Calvert City, (D2)...	226	Denton, (M4).....	200	Fort Thomas, (J2)...	5,028	Hilda, (K4).....	100
Barkston, (F5)...	1,717	Campbellsburg, (C3)...	350	Dexter, (C3).....	278	Fort, (J3).....	158	Hillsboro, (K4)...	151
Bardwell, (C3)...	1,120	Campbellsville, (G6).....	1,535	Dixon, (B5).....	716	Fount, (K7).....	250	Hillsdale, (C6)...	400
Bardow, (B3).....	654	Camp Nelson, (H5)...	100	Dover, (K3).....	377	Fountain Run, (F7)...	146	Hima, (K6).....	200
Barnsley, (B6).....	250	Campton, (K5)...	277	Dowagiac, (F6)...	100	FRANKFORT, (H4).....	9,805	Himerville, (N5)...	200
Baskett, (C5).....	100	Canada, (N5)...	200	Drakesburg, (C6)...	148	Franklin, (D7)...	3,154	Hindman, (M6)...	467
Battletown, (E4)...	100	Cane Valley, (G6)...	126	Drift, (M6).....	150	Franklinton, (G4)...	100	Hinton, (H4)...	150
Baxter, (L7).....	150	Caneville, (L6)...	402	Drift Ridge, (H3)...	129	Fredonia, (A6)...	477	Ilseville, (F6)...	181
Beals, (C5).....	150	Canmer, (F6).....	156	Dublin, (C3)...	112	Frederburg, (K5)...	270	Hitchins, (M4)...	300
Beattyville, (K5)...	1,210	Canoe, (L6).....	100	Dunbar, (C6)...	148	Fullerton, (M3)...	600	Hodgenville, (F5)...	1,100
Beaver Dam, (D6)...	788	Canton, (B7).....	200	Dundee, (D5)...	150	Fulton, (C4).....	3,415	Holland, (E7)...	200
Bel, (D5).....	100	Carbon Glow, (M6)...	150	Dunmore, (H6)...	150	Gallup, (M4)...	100	Hopkinsville, (C7)...	9,696
Belford, (G3).....	240	Carlisle, (J4).....	1,569	Dwale, (M5).....	162	Gamaliel, (F7)...	200	Horse Branch, (D6)...	179
Beech Creek, (C6)...	160	Carrollton, (G3)...	2,281	Dycusburg, (D2)...	162	Gap Creek, (H7)...	100	Horse Cave, (F6)...	864
Beech Grove, (C5)...	152	Carrsville, (D2)...	323	Eads, (L4).....	100	Garfield, (E5)...	200	Horton, (D6)...	150
Bees Spring, (E6)...	100	Carter, (L4).....	203	Eads, (H7).....	100	Garfield, (E5)...	200	Hudson, (E5)...	150
Belcher, (N6).....	150	Carver, (L5).....	150	Earlington, (B6)...	3,652	Garrard, (K6)...	150	Hueysville, (M5)...	300
Belfry, (N5).....	150	Causey, (L6)...	100	East Bernstadt, (J6).....	1,000	Garrett, (M6)...	4,600	Hulen, (K7).....	400
Bellevue, (H2)...	7,379	Causey, (L6)...	100	East Point, (M5)...	709	Garrison, (L3)...	250	Huntersville, (G7)...	100
Belmont, (F5)...	100	Cave City, (F6)...	690	Eastview, (E5)...	49	Gauliff, (K7)...	150	Huntersville, (H6)...	372
Belton, (D6).....	200	Cave Spring, (D7)...	100	Echols, (D6)...	200	Gauliff, (K7)...	100	Hyden, (L6)...	313
Benham, (M7)...	100	Cayce, (B4).....	202	Eddyville, (A6)...	1,182	Genova, (B5)...	100	Ilseville, (B6)...	150
Benton, (D3).....	897	Cecilia, (E5)...	250	Eden, (M5).....	402	Georges Creek, (M5)...	100	Independence, (H3)...	153
Berea, (J5).....	1,649	Center, (F6)...	300	Edenton, (J5)...	100	Georgetown, (J4)...	3,903	Inez, (M5).....	500
Bernstalt, (J6)...	100	Centertown, (C6)...	343	Edmonton, (F6)...	284	Germantown, (J3)...	3,237	Ingle, (H6).....	100
Berry, (J3).....	532	Central City, (C6)...	3,108	Ekron, (E5).....	157	Ghent, (G3).....	438	Irvine, (K5)...	2,705
Berrys Fork, (D6)...	100	Cerulean, (B7)...	274	Eli, (H6).....	150	Gilbertsville, (D3)...	300	Irrington, (E5)...	655
Bethel, (K4).....	150	Chaplin, (G5)...	172	Elihu, (H6)...	100	Gilpin, (H6)...	150	Island, (C6)...	623
Bethelridge, (H6)...	100	Charters, (L3)...	100	Elizabethtown, (F5).....	2,530	Gilstrap, (D6)...	100	Isonville, (L4)...	100
Bethlehem, (G4)...	85	Chavies, (L7)...	200	Elizaville, (K4)...	200	Glasgow, (F6)...	2,559	Isonville, (M5)...	150
Betsy Layne, (M5)...	300	Chenova, (K6)...	100	Elk Horn, (G5)...	108	Glasgow Junction, (E6).....	307	Jackson, (L5)...	1,503
Bewier, (C6).....	1,000	Chicago, (G5)...	148	Elkhorn City, (N6)...	821	Glencoe, (H3)...	398	Jamestown, (G7)...	237
Big Bone, (H3)...	100	Clarkson, (E5)...	413	Elkton, (C7)...	1,009	Glendle, (F5)...	200	Jean, (M4).....	100
Big Clifty, (E5)...	250	Clay, (B6).....	1,378	Elliot, (C7)...	1,009	Glen Dean, (D5)...	200	Jefferson, (F4)...	350
Big Island, (N5)...	100	Clay City, (K5)...	602	Elliston, (B6)...	250	Glen Fork, (G6)...	100	Jeffersonville, (K5)...	53
Big Spring, (E5)...	150	Clearfield, (L4)...	350	Elmrock, (L6)...	100	Glenview, (C5)...	100	Jellico, (J7).....	471
Birdsville, (D2)...	355	Cleaton, (C6)...	350	Elmwood, (M6)...	150	Glenview, (C5)...	100	Jenkins, (M6)...	4,707
Birmingham, (D3)...	269	Clemensville, (G6)...	150	Elmore, (H3)...	919	Glenview, (C5)...	100	Jett, (H4).....	150
Blackey, (L6).....	413	Cliff, (M5).....	2,065	Elmore, (H3)...	919	Glenview, (C5)...	100	Joh, (M5).....	150
Blackford, (B6)...	613	Clifton, (J2)...	2,065	Elmore, (H3)...	919	Glenview, (C5)...	100	Jonesville, (H3)...	133
Blacks Ferry, (G7)...	100	Clifty, (C7).....	200	Elmore, (H3)...	919	Glenview, (C5)...	100	Junction City, (H5)...	722
Blaine, (M4).....	103	Clinton, (F3)...	1,455	Elmore, (H3)...	919	Glenview, (C5)...	100	Karlus, (H6)...	150
Blanche, (K7).....	200	Cloverport, (D5)...	1,509	Elmore, (H3)...	919	Glenview, (C5)...	100	Kearney, (I6)...	100
Blainville, (C3)...	233	Coalton, (M4)...	200	Elmore, (H3)...	919	Glenview, (C5)...	100	Keene, (H5)...	350
Blevins, (M4).....	100	Cody, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100	Kelly, (C7).....	100
Bloomfield, (G5)...	100	Coalton, (M4)...	200	Elmore, (H3)...	919	Glenview, (C5)...	100	Kenvir, (L7)...	1,000
Bluehole, (K6)...	103	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100	Kerbyknob, (J5)...	100
Bluff City, (C5)...	135	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100	Kettle Island, (K7)...	200
Boaz, (C3).....	100	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100	Kevil, (C3).....	261
Bond, (T6).....	1,000	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100	Keysburg, (C7)...	150
Bondville, (H5)...	150	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100	Kilgore, (M4)...	100
Bon Jellico, (I7)...	100	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100		
Bonnieville, (F6)...	300	Colt, (M6).....	100	Elmore, (H3)...	919	Glenview, (C5)...	100		





KENTUCKY

SCALE OF MILES

State Capitals County Seats

Railroads

Railroads not in operation

All railroads are numbered as per accompanying list, making possible quick and accurate identification of each line.

8000
to
5000 ft.

2000
to
8000 ft.

1000
to
2000 ft.

500
to
1000 ft.

100
to
500 ft.

Hammond's County Map of Kentucky
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How to Read a Map: See page xvi, facing text page 1.

KENTUCKY *Continued*

Kings Mountain, (H6).....	300	Maud, (G5).....	100	Olympia, (K4).....	200	Russellville, (D7)...	3,124	Talbert, (L6).....	100
Kingston, (J5).....	150	Mayfield, (C3).....	6,583	Oneida, (K6).....	350	Ruth, (H6).....	100	Taylorsville, (G4)...	673
Kinniconick, (L3)...	100	Mays Lick, (K3)...	366	Onton, (C5).....	150	St. Charles, (B6)...	604	Texas, (G5).....	150
Kirk, (E5).....	100	Maysville, (K3)...	6,107	Ophir, (M5).....	100	St. Helens, (K5)...	167	Thousandsticks, (L6)	100
Kirkmansville, (C6)	178	Means, (K5).....	150	Oppy, (N5).....	250	St. Mary, (G5).....	149	Tilden, (B5).....	140
Kitts, (L7).....	200	Melber, (C3).....	200	Orel, (F4).....	100	St. Matthews, (F4)	2,500	Tilford, (D6).....	100
Knifley, (G6).....	200	Melbourne, (J2)...	337	Orlando, (J6).....	200	Sacramento, (C6)...	410	Tiline, (D2).....	100
Knob Lick, (F6).....	200	Mentor, (J3).....	150	Owensboro, (C5)...	17,424	Sadieville, (H4)...	448	Tilton, (K4).....	100
Knottsville, (D5)...	248	Mercer, (C6).....	1,217	Owenton, (H3)...	971	Salem, (D2).....	252	Todd, (H6).....	100
Kuttawa, (D3).....	850	Merrimac, (G6)...	100	Owingsville, (K4)...	781	Salt Lick, (K4)...	518	Toler, (N5).....	100
Kyrock, (E6).....	200	Middleburg, (H6)...	197	Paducah, (C3).....	24,735	Salvisa, (H5).....	300	Tollesboro, (K3)...	350
La Center, (C3).....	627	Middlesboro, (K7)...	8,041	Paintlick, (J5)...	300	Salyersville, (L5)...	412	Tolu, (D2).....	225
La Fayette, (B7)...	307	Midway, (H4).....	915	Paintsville, (M5)...	1,383	Samuels, (G5).....	150	Tompkinsville, (F7)	721
La Grange, (G4)...	1,060	Milburn, (C3).....	282	Paris, (J4).....	6,310	Sanders, (H3).....	291	Torment, (K5)...	200
Lair, (J4).....	150	Milford, (J3).....	200	Park, (F6).....	150	Sandgap, (J6).....	150	Trammel, (E7)...	100
Lakeville, (L5).....	150	Millard, (N6).....	200	Parksville, (H5)...	220	Sandy Hook, (L4)...	150	Trenton, (C7)...	552
Lamasco, (B7).....	100	Millersburg, (J4)...	1,117	Patesville, (D5)...	200	Sardis, (K3).....	250	Trinity, (K3).....	200
Lancaster, (H5)...	2,166	Millertown, (E6)...	140	Pembroke, (C7)...	685	Sassafra, (M6)...	200	Turners Station, (G3)	125
Laurel Creek, (K6)	150	Million, (J5).....	150	Perryville, (H5)...	631	Savage, (G7).....	150	Tyler, (C3).....	300
Lawrenceburg, (H4)	1,811	Mill Springs, (H7)...	150	Persimon, (F7)...	150	Savoy, (J7).....	100	Tyner, (K6).....	150
Lawrenceville, (H3)	150	Millstone, (M6)...	200	Petersburg, (H2)...	331	Saxton, (J7).....	100	Typo, (L6).....	200
Lawton, (L4).....	150	Milltown, (G6)...	150	Petersville, (L4)...	100	Saylor, (L7).....	100	Tyrone, (H4)...	272
Lebanon, (G5).....	3,239	Millwood, (E6)...	150	Petroleum, (E7)...	100	Scalf, (K7).....	100	Union, (H3).....	100
Lebanon Junction, (F5).....	882	Milo, (M5).....	150	Pettit, (C5).....	100	Schoch, (D7).....	100	Union Star, (E5)...	100
Lee City, (L5).....	152	Milton, (G3).....	320	Pewee Valley, (F4)...	649	Science Hill, (H6)...	331	Uniontown, (B5)...	1,094
Leitchfield, (E5)...	1,077	Minerva, (K3).....	103	Peytonsburg, (G7)...	150	Scottsville, (E7)...	2,179	Upton, (F6).....	369
Lenox, (L5).....	100	Mintown, (H6)...	100	Phelps, (N5).....	250	Scoville, (K6).....	100	Utica, (C5).....	250
Lenoxburg, (J3)...	63	Mitchellsburg, (H5)	200	Phil, (H6).....	250	Sebree, (J5).....	1,258	Valley Station, (F4)	270
Level Green, (J6)...	100	Molus, (L7).....	150	Philpot, (D5).....	150	Seco, (M6).....	535	Vanceburg, (L3)...	1,353
Lewisburg, (D7)...	334	Monterey, (H4)...	273	Pikeville, (M6)...	2,110	Sedalia, (C3).....	200	Van Lear, (M5)...	2,056
Lewisport, (D5)...	572	Monticello, (H7)...	1,514	Pilgrim, (N5).....	200	Sewellton, (G7)...	140	Verona, (H3)...	199
Lexington, (J4)...	41,534	Mooleyville, (E4)...	150	Pine Hill, (J6)...	300	Shady Grove, (B6)	210	Versailles, (H4)...	2,061
Liberty, (H6).....	368	Moorefield, (K4)...	220	Pine Knot, (J7)...	700	Sharon Grove, (C7)...	200	Vine Grove, (F5)...	594
Liggett, (L7).....	100	Moorman, (C6)...	180	Pineville, (K7)...	2,908	Sharpsburg, (K4)...	363	Visalia, (J3).....	200
Liletown, (F6).....	100	Morehead, (L4)...	981	Pittsburg, (J6)...	1,450	Shelbiana, (M6)...	200	Viva, (J6).....	100
Lily, (J6).....	250	Moreland, (H6)...	300	Pleasure Ridge Park, (F4).....	200	Shelbyville, (G4)...	3,760	Waco, (J5).....	200
Lisman, (B6).....	100	Morgan, (J3).....	200	Pleasureville, (G4)...	308	Shepherdsville, (F5)	520	Waddy, (G4).....	200
Liss, (N5).....	150	Morganfield, (B5)...	2,651	Pomeroyton, (K5)...	150	Sherburne, (K4)...	191	Wallingford, (K4)...	200
Livermore, (C6)...	1,426	Morgantown, (D6)	707	Poole, (B5).....	142	Sheridan, (D2)...	100	Wallins Creek, (L7)	500
Livingston, (J6)...	703	Mortons Gap, (C6)	1,061	Pool, (M7).....	300	Sherman, (H3)...	180	Wallonia, (B7)...	100
Lockport, (H4)...	137	Moscow, (C3).....	200	Poplar Plains, (K4)	1,000	Shoopman, (H7)...	200	Walsend, (K7)...	500
Lodiburg, (E5)...	100	Mossy Bottom, (M5)	150	Port Royal, (G3)...	152	Sibert, (K6).....	150	Walnut Grove, (L5)	186
Logansport, (D6)...	100	Mount Carmel, (K4)	123	Porter, (C6).....	400	Simpsonton, (G4)...	189	Walton, (H3)...	642
Lola, (D2).....	150	Mount Eden, (G4)...	319	Powderly, (C6)...	100	Slade, (K5).....	150	Warfield, (N5)...	200
London, (J6).....	1,707	Mount Olivet, (J3)	340	Powersburg, (H7)...	100	Slaughters, (B5)...	664	Warren, (K7)...	100
Looneak, (C3).....	600	Mount Sterling, (K4).....	3,995	Praise, (N6).....	1,500	Slickford, (H7)...	100	Warsaw, (H3)...	600
Lookout, (N6).....	400	Mount Vernon, (J6)	719	Preston, (D6).....	100	Sloans Valley, (J7)...	200	Washington, (K3)...	500
Loretto, (G5).....	200	Mount Washington, (F4).....	400	Preston, (K4).....	150	Smithfield, (G4)...	143	Water Valley, (C4)	377
Lothair, (L6).....	2,000	Mudlick, (F7).....	100	Prestonsburg, (M5)	1,667	Smithland, (D2)...	559	Waverly, (B5)...	475
Louellen, (M7)...	500	Munfordville, (F6)	583	Prestonville, (G3)...	131	Smith Mills, (B5)...	250	Wayland, (M6)...	1,362
Louisa, (M4).....	2,011	Murray, (D3).....	2,415	Prices Mill, (D7)...	100	Smiths Grove, (E6)	815	Waynesburg, (H6)...	400
Louisville, (F4)...	305,935	Muses Mills, (K4)...	100	Princeton, (B6)...	3,689	Soldier, (L4).....	250	Webbville, (M4)...	150
Love, (D6).....	400	Myers, (K4).....	200	Proctor, (K5)...	245	Somerset, (H6)...	4,672	Webster, (E5)...	150
Lovelaceville, (C3)	400	Myra, (M6).....	200	Prospect, (F4)...	100	Sonora, (F5).....	274	Weeksburg, (M6)...	1,016
Loves, (C3).....	200	Nancy, (H6).....	350	Providence, (B6)...	4,151	Sorgho, (C5).....	100	West Irvine, (J5)...	250
Ludlow, (H2).....	4,582	Narrows, (D5)...	150	Pryorsburg, (C3)...	238	South Carrollton, (C6).....	328	West Liberty, (L5)	461
Luzerne, (C6).....	100	Nebo, (B6).....	265	Pulaski, (H6)...	100	South Corbin, (J7)...	200	West Louisville, (C5).....	200
Lykins, (L5).....	140	Ned, (L6).....	160	Quincy, (L3).....	167	Southgate, (J2)...	699	West Point, (F5)...	724
Lyndon, (F4).....	100	Neon, (M6).....	493	Raceland, (M3)...	300	South Portsmouth, (L3).....	400	Westport, (G4)...	200
Lynn Grove, (D4)...	150	Nepton, (K4).....	200	Raven, (M6).....	150	South Union, (D7)...	100	West Prestonsburg, (M5).....	150
Lynnville, (C4)...	157	New Castle, (G4)...	397	Ravenna, (K5)...	750	Sparks, (H6).....	150	West Van Lear, (M5)	500
McAndrews, (N5)...	200	New Liberty, (H3)...	342	Raywick, (G5)...	167	Sparta, (H3).....	197	Wheatcroft, (F6)...	400
McCall, (M3).....	300	New Concord, (F4)...	150	Redhouse, (J5)...	200	Spottsville, (C5)...	362	Wheelwright, (M6)	506
McHenry, (D6)...	439	New Hope, (F5)...	207	Redwine, (L5)...	150	Springfield, (G5)...	1,529	Whitehouse, (M5)...	320
McKee, (J6).....	173	New Liberty, (H3)...	342	Reed, (C5).....	400	Spring Lick, (D6)...	200	White Plains, (C6)	315
McKinney, (H6)...	450	New Market, (G5)...	342	Regina, (N6).....	200	Spurlington, (G6)...	100	Whitesboro, (F6)...	706
McQuady, (D5)...	100	Newport, (I2).....	29,317	Repton, (A6).....	400	Stamping Ground, (H4).....	335	Whitesville, (T5)...	437
McRoberts, (M6)...	2,146	Nicholasville, (H5)	2,786	Reynolds Station, (D5).....	150	Stanford, (H5)...	1,397	Whitley City, (J7)...	495
Maceo, (D5).....	150	Nolin, (F5).....	200	Richardson, (M5)...	150	Stanley, (C5).....	150	Wickliffe, (B3)...	969
Mackville, (G5)...	251	Norfolk, (J6).....	100	Richmond, (J5)...	5,622	Stanton, (K5).....	311	Willard, (M4).....	456
Madisonville, (C6)	5,030	North Fork, (K3)...	200	Rineyville, (E5)...	150	Star Lime Works, (D3).....	100	Williamsburg, (J7)	1,767
Magnolia, (F6)...	200	North Middletown, (J4).....	339	Roark, (L6).....	130	Stearns, (J7).....	1,000	Williamstown, (H3)	836
Majestic, (N5)...	100	North Pleasureville, (G4).....	248	Robards, (B5)...	300	Stephensburg, (E5)	100	Willburg, (G5)...	200
Malcolm, (K6)...	100	Nortonville, (C6)...	773	Rochester, (D6)...	415	Sparks, (H6).....	150	Wildie, (J6).....	200
Mammoth Cave, (E6).....	200	Oakdale, (F4).....	3,198	Rockfield, (D7)...	209	Sparta, (H3).....	197	Wilmore, (H5)...	1,157
Manchester, (K6)...	550	Oakland, (E6).....	252	Rockhold, (D7)...	209	Spottsville, (C5)...	362	Wilton, (J7).....	200
Manitow, (B6).....	150	Oakton, (B3).....	200	Rockholes, (J7)...	430	Springfield, (G5)...	1,529	Winchester, (J4)...	8,333
Mannington, (C6)...	200	Oakville, (D7)...	150	Rockport, (D6)...	650	Spring Lick, (D6)...	200	Wingo, (C7).....	439
Marcellus, (H5)...	100	Ofutt, (M5).....	150	Rome, (C5).....	132	Spurlington, (G6)...	100	Wofford, (J7)...	150
Marion, (A6).....	1,718	Okolona, (F4)...	150	Rose Hill, (H5)...	150	Stamping Ground, (H4).....	335	Wolf Coal, (I6)...	250
Marrowbone, (G7)	200	Olaton, (D5).....	150	Rosewood, (C6)...	105	Stanford, (H5)...	1,397	Woodbine, (J7)...	200
Martha, (M4).....	150	Olmstead, (C7)...	150	Rosine, (D6).....	176	Stanley, (C5).....	150	Woodburn, (F7)...	221
Martin, (M5).....	450			Round Hill, (E6)...	100	Stanton, (K5).....	311	Woodbury, (F6)...	145
Martinsburg, (L4)...	150			Rowletts, (F6)...	270	Star Lime Works, (D3).....	100	Wootton, (L6)...	110
Mason, (H3).....	150			Royalton, (M5)...	200	Stearns, (J7).....	1,000	Worthville, (G3)...	315
Mattingly, (D5)...	100			Roxana, (M6)...	150	Stephensburg, (E5)	100	Wrigley, (L4).....	200
				Rumsey, (C5)...	139	Spottsville, (C5)...	362	Wurtland, (M3)...	190
				Rush, (M4).....	300	Springfield, (G5)...	1,529	Yancey, (L7).....	200
				Russell, (M3)...	1,756	Spring Lick, (D6)...	200	Yerkes, (L6).....	150
				Russell Springs, (G6)	125	Spurlington, (G6)...	100	Yosemite, (H6)...	155
						Stamping Ground, (H4).....	335	Zion, (B5).....	200
						Stanford, (H5)...	1,397		
						Stanley, (C5).....	150		
						Stanton, (K5).....	311		
						Star Lime Works, (D3).....	100		
						Stearns, (J7).....	1,000		
						Stephensburg, (E5)	100		
						Spottsville, (C5)...	362		
						Springfield, (G5)...	1,529		
						Spring Lick, (D6)...	200		
						Spurlington, (G6)...	100		
						Stamping Ground, (H4).....	335		
						Stanford, (H5)...	1,397		
						Stanley, (C5).....	150		
						Stanton, (K5).....	311		
						Star Lime Works, (D3).....	100		
						Stearns, (J7).....	1,000		
						Stephensburg, (E5)	100		
						Spottsville, (C5)...	362		
						Springfield, (G5)...	1,529		
						Spring Lick, (D6)...	200		
						Spurlington, (G6)...	100		
						Stamping Ground, (H4).....	335		
						Stanford, (H5)...	1,397		
						Stanley, (C5).....	150		
						Stanton, (K5).....	311		
						Star Lime Works, (D3).....	100		
						Stearns, (J7).....	1,000		
						Stephensburg, (E5)	100		
						Spottsville, (C5)...	362		
						Springfield, (G5)...	1,529		
						Spring Lick, (D6)...	200		
						Spurlington, (G6)...	100		
						Stamping Ground, (H4).....	335		
						Stanford, (H5)...	1,397		
						Stanley, (C5).....	150		
						Stanton, (K5).....	311		
						Star Lime Works, (D3).....	100		
						Stearns, (J7).....	1,000		
						Stephensburg, (E5)	100		
						Spottsville, (C5)...	362		
						Springfield, (G5)...	1,529		

mainder of the state's church members belong to the Presbyterian Church.

Education. The educational conditions of Kentucky have long been unsatisfactory, on account of its largely scattered rural population and its poor system of roads. In recent years, measures have been introduced that have produced noticeable improvements. A law requiring one high school in each county was enacted in 1908. A compulsory educational law was enacted in 1912, which has been strengthened until it now requires each child in the state to be in attendance in an elementary school for the full term of that school.

Perhaps the most significant advance in the educational development of the state has been in the method of electing the county superintendent of schools. Until 1920 the county superintendent was a political officer. The legislature of that year enacted a law placing the selection of this official in the hands of a county board of education composed of five members, who are elected by the people of the county. This law has resulted in greater educational growth than any other single piece of legislation that has been enacted. The state superintendent of public instruction is still elected by the people for a term of four years. He has supervision of the public-school program of the state. By virtue of his office, he is chairman of the board of regents of the four teachers' colleges, and a member of the board of trustees of the University of Kentucky.

There are separate schools for white and negro children. In 1924 an act became effective requiring Bible reading in the common schools of the state; a selection must be read in each classroom each day. Revocation of teachers' certificates is provided for failure to comply with the law. Courses in agriculture and home economics have been added to the public-school curriculum.

Twelve of the Southern and Southwestern states have a higher illiteracy rate than Kentucky's, which is 8.4 per cent. Kentucky reduced its illiteracy percentage almost four per cent between 1910 and 1920. The negro percentage is still high, but once adequate provision is made for negro students, this also should drop, for in spite of the lack of high schools, the percentage of negro high-school pupils is almost as great as that of white pupils. Of late years, an active movement to reduce the number of adult illiterates has been started, the chief means employed being the opening of the public schools at night for adult instruction (see *MOONLIGHT SCHOOLS*). Community centers and schools have been started to reach the mountain sections, and the results obtained by such centers as the Hindman Settlement, Caney Creek Community Center, and Pine Mountain Settlement

have been invaluable in showing the need for such work.

The state maintains four teachers' colleges for training white teachers, at Richmond, Bowling Green, Murray, and Morehead, and there is a normal school for negro teachers at Frankfort. There is also an industrial college at Paducah for negroes. Among the other schools for negroes are Bowling Green Academy at Bowling Green, Danville Polytechnic Seminary at Danville, Simmons University at Louisville, Lincoln Institute near Shelbyville, Free Memorial Institute at Camp Nelson, and Wayman Institute at Harrodsburg. Kentucky has numerous junior colleges. The important schools of higher learning include Centre College at Danville; Kentucky Wesleyan College at Winchester; Transylvania University at Lexington; Georgetown College; Asbury College at Wilmore; Union College at Barbourville; and Berea College.

Berea College, at Berea, located in the edge of the Cumberland Mountains, was founded in 1855 to provide an opportunity for the education of mountaineers; the tuition fee is small. In addition to the college, the institutions include an academy, a normal school, and several vocational schools. An extension service, reaching distant communities, is a noteworthy feature. The college is coeducational and non-sectarian. Until 1904, negro teachers were trained there; they are now taught at Lincoln Institute, near Shelbyville.

University of Kentucky, a coeducational institution located at Lexington, under the control of the state of Kentucky since 1878. It was founded in 1865 as a part of Kentucky University, which is now known as Transylvania College, and was reorganized in 1878 under the name of the Agricultural and Mechanical College. Its name was later changed to Kentucky State University, and still later to the University of Kentucky. The college of agriculture of the University operates an agricultural experiment station and farm (588 acres—475 owned, 113 leased), with substations at Quicksand (1,500 acres) and Princeton (460 acres), and it operates seven soil-experiment stations in different parts of the state.

University of Louisville, at Louisville, was founded and is maintained by the city of Louisville. In 1925 \$1,000,000 was received from the city for new buildings, and the School of Arts and Sciences was moved to a new fifty-five-acre campus. Recent additions to the university have been the Speed Scientific School, the Louisville College of Dentistry (formerly a part of Centre College), an Art Museum, and an extension center for negroes.

Charitable and Penal Institutions. Under the supervision of a state board of charities and corrections, the state maintains a school for the blind at Louisville, one for the deaf and dumb at Danville, and one for feeble-minded children at Frankfort. The state prisons are situated at Frankfort and Eddyville; there is also a state reformatory at Frankfort, and state schools of reform for boys and girls at Greendale. Insane asylums are maintained at Lakeland, Lexington, and



THE FALLS OF THE OHIO

Hopkinsville. There are several hospitals maintained by the state, and a Confederate Soldiers' Home is located at Pewee Valley. A home for the poor and orphaned children of the state is located in Louisville.

Physical Features. The surface of the state as a whole is mainly a plateau, having an average height of about 800 feet above sea level, and sloping gently toward the north and west to the Ohio and Mississippi rivers. This plateau is divided, however, into a number of distinctly marked physical regions. The southeastern portion is mountainous and belongs to the Appalachian Mountain system, known here as the Allegheny Mountains. Here are found the Cumberland Mountains, which extend along most of the southeastern boundary, and contain the highest point in the state, Big Black Mountain, with an altitude of 4,100 feet. West of the Cumberland Mountains, and nearly parallel with them, is the shorter range of the White Mountains. Between these two ranges lies the Cumberland Valley, which has a length of seventy-five miles and a breadth of about fifteen miles; it is situated at an elevation of 1,000 to 1,500 feet, and is buttressed by peaks sometimes 3,500 feet high. The combination of mountain and valley in this region forms some of the most beautiful scenery in the Appalachian system. This entire region is an immense coal and forest area, and mining is the chief occupation of the people. The land is so rugged that there is little farming, and the roads are too poor to afford ready communication.

The greater part of the north-central portion of the state is rolling or undulating. In the central part of this area is the famous blue-grass region, which covers an area of approximately 1,200 square miles. It is noted for its great soil fertility, owing to its origin from a highly phosphatic limestone. Due to the character of the soil, blue grass thrives unusually well and affords pasturage

approximately eight months in the year. The luxuriant growth covers the rolling fields for mile upon mile throughout Central Kentucky, and gives it the popular name of the BLUE GRASS STATE. Blue-grass pasture is probably the best-known grass for grazing purposes for horses. Consequently, this small area in the heart of Kentucky has become the greatest horse-breeding center in the world. This area is noted not only for its fine horses, but for its beautiful country estates.

West of this section, and extending across the state from north to south, is the "Penny-rile" region, so called from the pennyroyal, which flourishes throughout this section. Here are considerable timber areas and some good farming land; in the northwest, a great portion is underlaid with coal, a continuation of the great coal fields of Illinois and Indiana. It was in the backwoods of the "Pennyrile" region that the log cabin stood which, in 1809, was Abraham Lincoln's first home. And in this same region was born, a year earlier, Jefferson Davis.

The southern part of this region is a continuation of the highland rim of Tennessee. Some parts of it are rolling and hilly; others, like the "barrens" between the Green and Cumberland rivers, are level. Prominent features of this portion are numerous circular depressions, or "sink-holes," on the surface, and a labyrinth of underground passages leading for endless miles and connecting numerous caverns. Kentucky is noted for these caverns; one of them, the Mammoth Cave (which see), is one of the largest caves in the world. The whole of this cavernous area is underlaid by thick formations of limestone.

The extreme southwestern corner, hemmed in by the Ohio, Tennessee, and Mississippi rivers, is known as the *Jackson Purchase*. The principal crops are dark tobacco and corn, with cotton in some of the river bottoms.

Crop after crop of corn is raised on the rich alluvial soils. There is considerable timber land in this area.

Its Forests. Kentucky was in former times almost completely covered with forests, both coniferous and hardwood, and even now a tenth or more of the surface of the state is wooded, although chiefly with second-growth trees. A great quantity of fine timber, most of it hardwood, is cut every year, and brings the state considerable wealth. The logs are floated down the streams to the great sawmills. The chief trees are oak of various species, maple, beech, ash, elm, walnut, sweet gum, birch, cedar, white pine, spruce, and yellow pine. A forestry commission is engaged in the preservation and reforestation of depleted areas.

Its Rivers. Most of the rivers in the state rise in the mountains or on the Allegheny plateau, and flow in a general northwesterly direction into the Ohio. This river flows along the entire northern border of the state in a winding course of nearly 600 miles, and forms an important navigable waterway. The principal streams, from west to east, are the Tennessee, the Cumberland, the Green, the Kentucky, the Licking, and the Big Sandy. Most of these are navigable for long distances. The Cumberland flows through the eastern and south-central parts of the state, then turns south into Tennessee, but farther west enters Kentucky again, and joins the Ohio a few miles east of the mouth of the Tennessee. Some of these rivers have worn deep channels through the hills and low mountains. The drainage of the cave region is mostly through underground channels. Kentucky's beautiful streams are favorite resorts for anglers. On the Cumberland and Tennessee rivers, forts Henry and Donelson, of War of Secession fame, were located.

Climate. Kentucky has a warm-temperate, equable, and healthful climate, which is more agreeable here than in the more open prairie states situated in the same latitude. This is due to the rolling and hilly surface of the state, which protects it from winds. The mean annual temperature varies from fifty degrees in the Cumberland range of the east to sixty degrees in the western lowlands along the Mississippi. The winters are warm, having an average of 35° F., and except in the mountainous eastern regions, there is but little snow. The average rainfall is about forty inches a year in the northern counties, and fifty-three in the mountainous region.

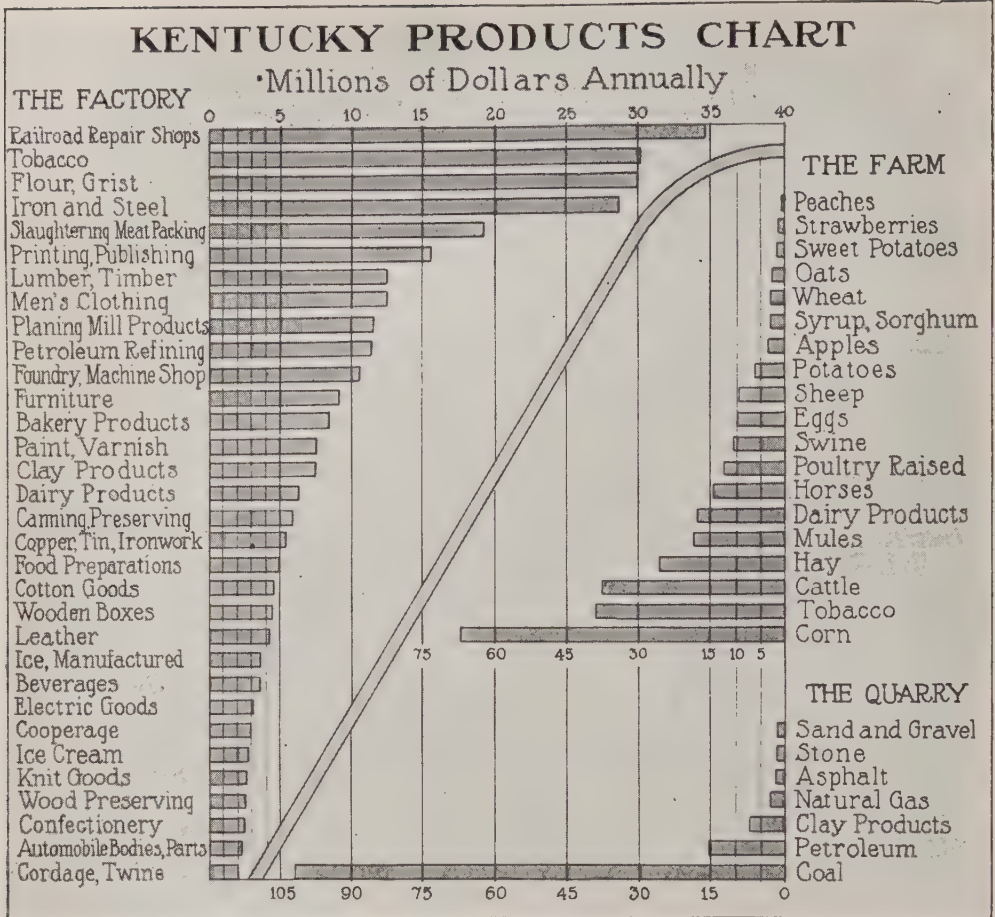
Agriculture. With its fine climate and fertile river bottoms, Kentucky is essentially an agricultural state. Of its land area, seventy-seven per cent is in farms. Of the farm land, thirty-one per cent is devoted to crops for harvest and thirty-five per cent to pasture,

the remainder being in woodlands. Kentucky livestock and farm products are symbolical of high quality. Crops, dairy products, poultry, eggs, and wool have an annual value of over \$225,000,000.

Tobacco. The most characteristic crop in this state is tobacco. In its production Kentucky leads all states except North Carolina, with an annual average of about 375,000,000 pounds a year. Kentucky and North Carolina are the great tobacco-growing states; each produces considerably more tobacco than Virginia, the next state in rank of tobacco production. Kentucky's success with this crop is due not only to the nature of its soil, which is specially adapted to the cultivation of tobacco, but also to its sunny, equable climate, free from extremes of heat and cold, the presence of which are fatal to the growth of such a delicate plant. The area planted to tobacco is nearly all in the western part of the state. One of the principal tobacco-growing regions is the "black patch," in the southwest corner of the state, bordering on the Tennessee "black patch." This produces a black, heavy leaf, which is sold almost entirely for export. Another tobacco region is in the blue-grass country, centered about Lexington; and its product, the red and white Burley, is a light leaf, used largely for manufacturing smoking and chewing tobacco.

Other Crops. Surpassing tobacco, and indeed all other crops combined, is corn. This has long formed the staple, not only for human food, but also for livestock. Corn can be cultivated in any section of the state, but is particularly productive in the overflow lands along the rivers. About 3,500,000 acres are planted to corn, and the average yield is about 95,000,000 bushels a year. Wheat is another crop of importance produced on the rolling lands of Kentucky. Other cereals, such as oats, rye, and barley, are grown for feeding. In addition to the native blue grass, great fields of white clover, red clover, and other hay are grown for pasture; alfalfa is grown for winter feed.

Since 1921, coöperative associations for the sale of tobacco have been marketing the crops very successfully. Wool, poultry, truck crops, livestock, and dairy products are now being marketed in the same way, much to the advantage of the farmers. Potatoes, sweet potatoes, and other market vegetables are raised in large quantities. Sorghum cane is an important crop, in which Kentucky shares leadership among the states with Tennessee and Missouri. Orchard fruits, especially apples and peaches, and small fruits such as strawberries, blackberries, and raspberries, grow in the Ohio Valley and on mountain slopes. Hemp, long a characteristic crop of Kentucky, still covers acre after acre with its towering foli-



age, although it is no longer a great money-making crop.

Stock-Raising. The superb pasture afforded by the blue-grass region; the mild climate, in which cattle can remain in the fields nearly all winter; the large production of corn and forage crops; and the streams of pure, clear water have all contributed to make Kentucky an important stock-raising state. Kentucky is famous for thoroughbred horses. The Kentucky Derby has been a world-famous race since its start in 1875. Many of the most famous horses on the American turf have been Kentucky-bred; probably the greatest horse-breeding district in the world is contained in a few counties in the blue-grass region. Many mules, sheep, hogs, and cattle are pastured in great numbers on the wide blue-grass plains. Dairying is an important industry, and the flocks of sheep produce considerable wool. Turkeys and other fowls are raised in great numbers.

Minerals. Kentucky has great mineral resources, which are not yet fully developed.

The annual value of mineral production is in the neighborhood of \$130,000,000. The principal product is coal, and Kentucky usually ranks fourth among the coal-producing states, being surpassed only by Pennsylvania, West Virginia, and Illinois. The annual production is now over 45,000,000 tons, and the supply is practically inexhaustible. The coal fields are found in two separate areas, the Appalachian area and the western coal field. Coal was mined here as early as 1827, and Kentucky was the third state in the Union to become a regular producer of coal. Petroleum and natural gas are found in many places, particularly in or near the coal region, and Kentucky now ranks tenth in petroleum production. Beds of excellent iron ore are also found in the northeastern coal regions. Western Kentucky produces an abundance of fluor spar, ranking second in its production. Clay suitable for brick and tile and for pottery is found in abundance, and building and other stones are extensively quarried. After ranking second for many years in the production of asphalt,



Photo: Visual Education Service

THE GOVERNOR'S MANSION

Kentucky became the leading state in 1923. Limestone underlies the entire state, and considerable quantities of both portland and natural-rock cement are produced. Kentucky ranks fifth among the states in number of persons engaged in mining.

Manufactures. The state has potential resources for a large industrial development. It possesses great mineral wealth, extensive forests, large herds of cattle; it grows large crops; it has numerous waterways that afford cheap transportation. Manufactures reach an annual value of over \$400,000,000. Its special industries have been the distilling of alcoholic liquors and the manufacture of tobacco. The distilling of liquors is an industry for which during more than a hundred years the state was noted throughout the world; its most famous product was Kentucky Bourbon whisky. The industry was established in 1794, when a large number of distillers from Pennsylvania removed to Kentucky after the Whisky Insurrection (which see). In the manufacture of distilled liquor, Kentucky held second place among the states, making one-fifth of the "hard liquor" output of the nation, prior to the advent of national prohibition. The Eighteenth Amendment destroyed the industry.

The manufacture of tobacco is also one of the oldest industries in the state. It dates from the eighteenth century, when tobacco was here legal tender and every town had its tobacco factories. Louisville has been for a long time one of the great leaf-tobacco markets.

The lumber and timber industry is growing very rapidly. Logging is important on the rivers in the mountain regions, and numerous planing mills have been established near the forests. Flour and grist mills are frequent in the cereal areas. Meat packing and slaughtering is an important and rapidly developing

industry. The manufacture of leather from the hides of the animals slaughtered is important, the bark of the numerous chestnut oaks supplying excellent material for tanning. Iron and steel mills are increasing in number, the raw material being supplied by the extensive iron-ore deposits found in the state. Bricks, tile, and pottery are made from the clay deposits. Louisville has the principal oil refinery.

Transportation. The Mississippi River and the Ohio and its numerous tributaries furnish extensive waterways suitable for cheap transportation, but the state is as yet inadequately supplied with railways. In fact, there are extensive areas covering thousands of square miles which are wholly without railway communication. Such is the mountainous region in the southeastern corner, and the south-central part of the state. Kentucky had 4,000 miles of railroad in 1925. The chief lines are the Illinois Central; the Louisville & Nashville; the Chesapeake & Ohio; the Cincinnati, New Orleans & Texas Pacific Railway (branch of the Southern Railway); and the Louisville, Henderson & Saint Louis. The blue-grass region is supplied with some of the finest highways in the country. Kentucky's native limestone provides unlimited material for construction. The Dixie Highway crosses the state from Louisville to the Tennessee line.

Government. Kentucky is governed under a constitution adopted in 1891. This is the fourth constitution the state has had since its admission to the Union in 1792. Amendments may be adopted if they receive three-fourths of the vote of each house of the legislature and are afterward approved by a majority vote of the people. A convention to revise the constitution or draft a new one may be convened after such a proposal has been adopted by

two successive legislatures and approved by a majority of the popular vote, provided that majority be at least one-fourth of the total number of votes cast at the preceding general election.

The executive officials, who are the governor, lieutenant governor, secretary of state, treasurer, auditor, attorney-general, superintendent of public instruction, registrar of land office, and commissioner of agriculture, labor, and statistics, are each elected for four years. All except the governor may be reelected. If a vacancy occurs in the office of governor in the first two years of his term, a new election is held; if during the last two years, the lieutenant governor serves out the term. Among the offices created recently are those of state commissioner of public roads and state fire marshal.

The legislative power is vested in a general assembly, composed of a senate and a house of representatives. The senate is composed of thirty-eight members, elected for four years, half of whom are retired every two years; the house of representatives is composed of 100 members, elected for two years. Sessions are held every second year.

At the head of the judicial department is a supreme court known as the court of appeals, consisting of not fewer than five nor more than seven judges, elected for eight years. The judge longest in service is chief justice. The state is divided into judicial districts, and every county possesses a circuit court, presided over by a judge elected in the district for six years. Each district has so-called quarterly courts, the judges of which are also justices of the county courts.

For purposes of local government, the state is divided into counties, and these into towns, which are divided into six classes, according to population. Towns and cities with a population of 3,000 inhabitants or over may adopt the commission form of government.

Other Constitutional Provisions. The marriage of whites and negroes is prohibited. The state adopted in 1912 a primary-election law for direct nominations of all elective state, county, and municipal officers. Legislation for the protection of the labor of women and children has been recently enacted. The working hours for women under twenty-one, except in domestic service and in nursing, are limited to sixty a week and ten a day, and these hours were made the maximum for all women working in factories, stores, hotels, and telephone and telegraph companies. The employment of children under fourteen during the school term is prohibited. Many provisions have been made for workmen's compensation, and in 1922 a child-welfare commission was established.

History. After many hunting expeditions into Kentucky, sometimes with companions,

sometimes alone, Daniel Boone, in 1773, led a little band of settlers into the state. On their way, several of the settlers, including Boone's young son, were killed by Indians, and the band turned back in terror, some to the settlement on the Yadkin River, some to Tennessee. Meanwhile, James Harrod entered the state from Pennsylvania and marked out a settlement where Harrodsburg now stands, the first permanent settlement in Kentucky.

During 1774 colonizing was interrupted by Dunmore's War. After some fighting, it was settled by treaty between Lord Dunmore, governor of Virginia, and the Shawnees, and settlers once more ventured into the territory. In North Carolina, Judge Richard Henderson and a group of men formed the Transylvania Company. This was a gigantic land scheme, based on a vague title to Kentucky which Henderson acquired by purchase from the Cherokee Indians, although both the Cherokees and Iroquois had ceded the land in 1768 to England, and the Shawnees had ceded it to Virginia at the close of Dunmore's War.

Daniel Boone was sent into Kentucky in 1775 to cut a wagon road along the famous Warriors' Path, and to build a fort, later Boonesborough. Henderson brought his colonists there, but his proprietorship was too high-handed for men on the eve of revolt against feudal institutions. Settlers passed by Boonesborough, settled upon land regardless of the Transylvania Company's claims, or joined the settlement at Harrodsburg.

During the Indian attacks, at the opening of the Revolutionary War, the settlers appealed to Virginia for protection, and for powder and arms. Fiction has no more thrilling tale than that of George Rogers Clark and Daniel Boone, as they fought, almost single-handed, to save the two Kentucky settlements, Harrodsburg and Boonesborough. Yet both of these men, who dared all, thinking not of self but of this new country, received little more than tardy thanks for their efforts.

In 1776 Kentucky was organized as a separate county of Virginia. In 1780 this was divided into three counties, and an agitation for its separation from Virginia and admission as a state to the Union was started. Virginia for a long time refused to consent to the separation, but finally passed the necessary legislation in 1790. On June 1, 1792, Kentucky was admitted as the fifteenth state of the Union.

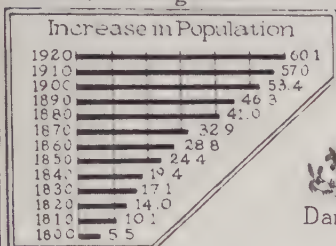
Kentucky took a prominent part in the War of 1812, its great leader, Henry Clay, being a conspicuous member of the war party. It also was well represented in the Mexican War. In the War of Secession, Kentucky at first attempted to remain neutral. Both Union and Confederate armies invaded the state, and it was the scene of important battles, including those of Mill Spring, Richmond, and Perry-



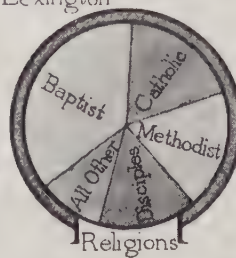
Lincoln Memorial Hall,
near Hodgenville



Ashland, Home of Henry Clay,
Lexington



Daniel Boone's Monument, Louisville



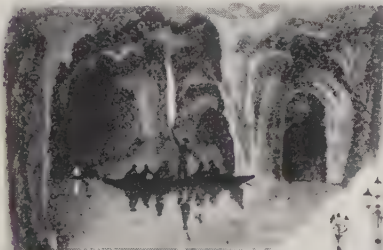
KENTUCKY



Birthplace of Abraham Lincoln



Daniel Boone's Log Cabin on
Kentucky River



Echo River, Mammoth Cave

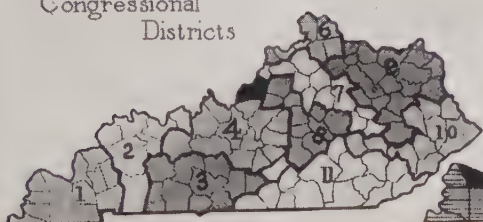


Confederate Monument, Louisville



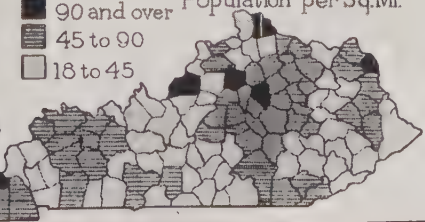
Natural Bridge

Congressional
Districts



Population per Sq.Mi.

90 and over
45 to 90
18 to 45



QUESTIONS ON KENTUCKY

(An outline suitable for Kentucky will be found with the article "State.")

Why is Kentucky peculiarly adapted to the growing of tobacco? Name some other tobacco states.

How does the product of the "black patch" differ from that of the blue-grass region?

What famous road crosses the state?

How does Kentucky compare in railway mileage with Ohio, the state which it most closely resembles in size?

How many negroes out of a hundred cannot read and write? How many native whites?

What does the state do toward the education of its negro population? What is being done for the education of illiterate adults and the mountaineer people?

Make a map of Kentucky, showing the physical divisions, mountains, rivers, crops, coal areas, and cave region.

To what two men does Kentucky owe a debt of gratitude for their share in the state's early history?

What has been done in connection with the school system to increase the interest of boys and girls in farm pursuits?

How did this state differ in its pioneer days from Iowa in point of forest growth?

Who was Kentucky's greatest statesman in the period before the outbreak of the War of Secession? How did the state stand with reference to that struggle?

How many states are larger? How many have a larger population?

Why is the climate of Kentucky more pleasant than that of some of its neighboring states?

How many stars were there in the flag after Kentucky was added to the Union?

How many states border on Kentucky without any rivers intervening? How many rivers touch its boundaries? Has it any mountain boundaries?

What river leaves the state and then enters it again? How is the southern limestone region drained?

What part has Kentucky played in the great horse races of the country? What part of the state is famous for this reason?

May a white man marry a negro woman within the borders of the state?

How many hours a day may women work in factories?

What famous men were born in Kentucky?

Why is this state of such a peculiarly irregular shape?

What is Kentucky's most famous natural curiosity? How was it formed? What are some of its curious features?

What valuable fiber plant does this state produce? What are its uses and how is it prepared?

What are the chief agricultural interests of the state? Which brings the greatest return, agriculture, mining, or manufacturing?

How many constitutions has the state had? When was the present one adopted?

If the governor should die during his first year in office, who would take his place? If he should die during his third year?

What does the name *Kentucky* mean? What is the popular name? Why was this region called the "dark and bloody ground"?

What product was used as money and passed as legal tender during the eighteenth century?

What was the first permanent settlement in Kentucky?

What was the cause of Lord Dunmore's War?

When was Kentucky a part of Virginia?

Why were the Kentuckians spared many of the evils of the period of reconstruction after the War of Secession?



Photo: U & U

A TYPE OF ARCHITECTURE IN KENYA

Homes of native revenue officers at Longino, on the boundary between Tanganyika Territory and Kenya Colony and Protectorate.

ville. This latter, a Federal victory, saved the state for the Union.

Although Kentucky had been split by the war, the loyalty of its native sons healed the wound much more quickly than was possible in some of the other states divided by the war. The war being over, both sides stood firmly together, and there was little of the reconstruction and "carpetbagger" problem in Kentucky. Progress was steady along agricultural and industrial lines. Recently, Kentucky wealth has suffered keenly as a result of the Eighteenth Amendment, as its distilling industry was the foremost in the country. But manufacturing and agricultural and mineral production are on the increase. Recent legislative acts in regard to education, public health, and public highways attest the progress of the state. The Democratic party is dominant, but in 1924 the state gave its electoral vote to Calvin Coolidge, Republican, and in 1928 to Herbert Hoover, of the same party.

W.S.T.

Related Subjects. The reader who is interested in Kentucky is referred to the following articles in these volumes:

CITIES

In addition to the cities here named, the reader is referred to other towns mentioned on the back of the state map.

Covington	Lexington	Louisville
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HISTORY

Boone, Daniel	Virginia (History)
Indians, American	War of Secession

LEADING PRODUCTS

Cattle	Horse
Coal	Sorghum
Corn	Tobacco

RIVERS

Cumberland	Mississippi
Green	Ohio
Kentucky	Tennessee

UNCLASSIFIED

Allegheny Mountains	Cumberland Mountains
Blue Grass	Mammoth Cave

KENTUCKY AND VIRGINIA RESOLUTIONS, a series of bills passed by the legislatures of Kentucky and Virginia in 1798 and 1799, directed against the Alien and Sedition Laws (which see). Those adopted by Kentucky were written by Thomas Jefferson; they declared for the right of the state to render void any Federal law which it considered unconstitutional. The Virginia Resolutions were probably written by James Madison; they contained the same principles as those put forward by Kentucky. Copies of the resolutions were sent to the other state legislatures, only seven of which replied, and these condemned them. See **STATES' RIGHTS**.

KENTUCKY RIVER, a waterway which rises in several headstreams in the Cumberland Mountains, and flows northwest for 260 miles through the most picturesque section of Kentucky, emptying into the Ohio River at Carrollton. It takes a zigzag course between limestone cliffs and green hills. The Kentucky is navigable for sixty miles, to Frankfort, owing to a system of locks and dams. See **KENTUCKY (Its Rivers)**.

KENYA, ken' yah, COLONY AND PROTECTORATE, an area comprising 225,100 square miles in East Africa, under control of Great Britain. Of the population of about 2,737,000, approximately 12,000 are Europeans

and 25,000 are immigrants from India. Before 1920 the region was known as East Africa Protectorate; in that year, its status was changed and it became a crown colony under control of the Imperial Colonial Office. It was then named for Mount Kenya, the highest mountain within its borders. The coast lands did not become a part of the crown colony, and these are governed as a protectorate.

The highland section, comprising about 12,000 square miles, is the only part well suited for the residence of white people, although some areas around Victoria Nyanza have been developed for plantations. The white people in the highlands raise coffee and sisal, in addition to the usual crops of temperate zones, though the colony is crossed by the equator. The natives cultivate many of the same products, and in the lowlands, rice, coconuts, cassava, and sugar cane are produced. There are about a thousand miles of railway. Within Kenya lie almost all of Lake Rudolph and about half of Victoria Nyanza.

Control is exercised by a governor and legislative council, and there is a provision that a majority in the latter shall be Europeans; five may be residents who have come from India, and two may be Arabs. The governor proposes laws, and they become effective with the consent of the council.

KEOKUK, IA. See Iowa (back of map).

KEOKUK DAM, one of the largest power dams in the world, extending across the Mississippi River from Keokuk, Ia., to Hamilton, Ill. From the fifteen turbine generators propelled by the water which passes over it, electric power is transmitted to Saint Louis, 145 miles away, and to smaller cities in Illinois, Iowa, and Missouri. The turbine wheels, one of which weighs sixty-five tons, or four times as much as any ever before made, will eventually be thirty in number, and together will produce 200,000 horse power. Each generator is able to supply 9,000 kilowatts of electricity, enough to light 225,000 lamps of the ordinary household type. Most hydroelectric generators are operated at a speed of from 200 to 500 revolutions per minute, but those at Keokuk are so large that they turn fewer than sixty times a minute. The amount of water which reaches the turbine is controlled by a governor so sensitive that the speed is changed even by the starting of a street car in Saint Louis.

The main part of the dam is 4,360 feet long and fifty-three feet high. It is set in the limestone bed of the river, and is of concrete without reinforcement. In each of the 119 arches through which the water flows, there is a steel gate which can be raised or lowered to regulate the height of water above the dam. The lock through which river shipping passes is the same width as those at Panama, but it

raises boats forty feet, eight feet more than the largest Panama lock.

Before the construction of the dam, the river for twelve miles above its site was navigable only for a very short season each year, except through a government canal with three locks. Now there is a deep lake, and steamboats save two hours in their passage up the Mississippi. The dam was put in operation July 31, 1913, after two and a half years of active work and an equal amount of preliminary labor. It is owned by a corporation—the Mississippi River Power Company. Its total cost was \$24,000,000.

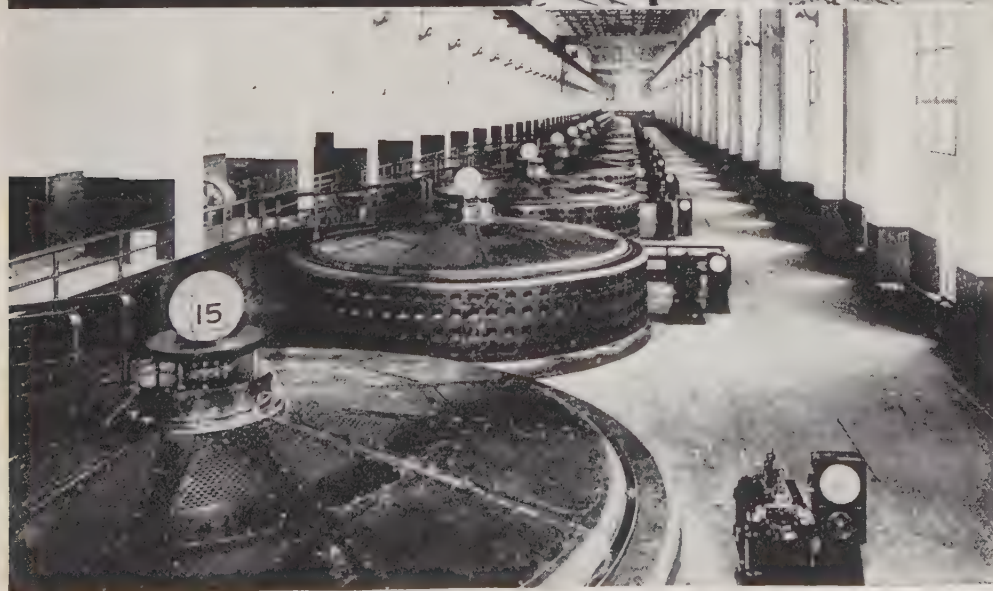
KEPLER, JOHANN (1571-1630), a German mathematician and astronomer, whose name will endure in the three imperishable principles



Photo: Brown Bros.

JOHANN KEPLER

of astronomy known as *Kepler's Laws*. He was born at Weil, in Württemberg, of poor parents. At four years of age, Kepler was left with crippled hands and impaired eyesight, the results of an attack of smallpox. He was educated at Maulbronn and the University of Tübingen, and was appointed to lecture on astronomy in Gratz at the age of twenty-two. In that day astronomers were chiefly employed in the construction of almanacs that pertained to the science of the stars, and Kepler set himself about mastering the art. The great question that he desired to answer was, how were the great bodies in the solar system kept in their position? He wrote a book on this subject which brought him to the attention of Tycho Brahe, who had him appointed as his assistant



Keokuk Dam. At top, a general view. Center, the original power house. At bottom, a view of the great generators.

in Prague. After Brahe's death, in 1601, a brilliant career was open to Kepler, as he was appointed imperial astronomer and mathematician. He supplied mathematical and physical conclusions in place of speculative theories, and the laws that he discovered while in this service became the foundation of astronomy on more scientific lines; they were of inestimable value to Newton in formulating the law of gravitation (which see). Kepler passed the latter part of his life at Linz, in Upper Austria, as professor of mathematics. See BRAHE, TYCHO.

Kepler's Laws. These fundamental concepts of planetary motion are as follows:

(1) Every planet describes an ellipse, the sun occupying one focus. See ELLIPSE.

(2) The line joining the center of the sun with the center of a planet sweeps over equal areas in equal times.

(3) The squares of the periods of complete revolution round the sun of two planets are proportional to the cubes of their mean distances from the sun.

KERENSKY, *kehr en' skie*, ALEXANDER (1881-), the head of Russia's provisional government in the interval between the abdication of Czar Nicholas II and the revolution which created the Russian Soviet Republic. Kerensky was born at Simbirsk, and was educated for the profession of law at the University of Saint Petersburg (subsequently Petrograd, and now Leningrad). He was successful as an attorney and also became widely known for his forceful speeches in



Photo: U & U

ALEXANDER KERENSKY

opposition to the government, while a Labor member of the Duma, to which he was elected in 1912. After the downfall of the czar's government, in 1917, Kerensky forged to the front as a leader of the moderate Socialists, becoming Premier and Minister of War. Lacking genuine constructive ability, he failed to reorganize the government as a constitutional republic, and in November, 1917, was driven from power by the Bolshevik elements under Lenin and Trotzky. Kerensky visited various countries after his downfall, in the interest of anti-Bolshevist propaganda, but he accomplished nothing of practical value. See RUSSIA (History); WORLD WAR (1917: Russia's Catastrophe).

KERIOTH. See APOSTLES (Judas Iscariot).

KERMIS. See FAIR.

KERNITE. See BORAX.

KERN LAKE. See CALIFORNIA (Waters).

KEROSENE, a colorless liquid composed of hydrogen and carbon, which formerly was widely used for illumination, heating, and cooking. Because it was first manufactured from coal, it became known as *coal oil*, and is still so called in some places. Dr. Abraham Gesner, who developed a commercial process for its production in Prince Edward Island, in 1846, gave it the name *kerosene* (from the Greek word for *wax*). This oil is now obtained largely in the refining of petroleum. The first oil well in the United States was bored in Pennsylvania in 1856, and kerosene became a staple article soon afterward. Into countless homes it brought a new form of illumination, causing the disappearance of the whale-oil lamp and the tallow and beeswax candle.

To-day, kerosene for household purposes is replaced in most communities by gas, electricity, and fuel oil, and since the discovery of the cracking process, in 1913, it has almost become a drug on the market. This process made possible so great an increased production of gasoline from crude oil that automobile manufacturers gave up trying to perfect an internal-combustion engine in which kerosene could be used. Except in some forms of tractor engines, kerosene is not a successful engine oil because it is not volatile enough. Among the distillate products of petroleum, it is heavier than gasoline, but lighter than the fuel oil used in household heaters, ship boilers, Diesel engines, and the like. See PETROLEUM.

KERR, SOPHIE (1880-), an American writer of novels and short stories, was born in Denton, Md., and was graduated from Hood College and the University of Vermont. She was married to John D. Underwood of Boston in 1904, but was divorced four years later. As woman's editor on two Pittsburgh (Pa.) newspapers in succession, she achieved no little success, and afterward became managing editor of the *Woman's Home Companion*.

Style and Representative Works. Miss Kerr writes with a great deal of animation, and her stories are excellently told. She is one of the nation's most popular composers of short stories; these appear largely in women's magazines. Her first notable work, *Love at Large*, was published in 1916; others are *The Blue Envelope*, *The Golden Block*, *The See-Saw*, *Painted Meadows*, *One Thing Is Certain*, and *Mareea-Maria*.

KERSEY, a thick, woolen cloth which may contain cotton warp with wool filling or cotton with yarn of wool. It is felted and napped, but dull in finish, and is used for uniforms and overcoats. It comes in widths of fifty and fifty-four inches.

KERTCH, STRAIT OF. See BLACK SEA.

KESTREL, OR **WINDHOVER**, a common bird of prey belonging to the falcon family, found throughout Europe and in Asia and

Northern Africa. It feeds principally on insects, frogs, mice, and other small animals, and lays its five creamy-white, brown-spotted eggs in the deserted nests of crows, among rocks, in hollow trees, or in ruins of buildings. It is sometimes called *windhover* on account of its habit of hanging in the air for a minute or two in the same spot, beating its wings rapidly, with head turned windward. The kestrel is one of the smallest of its family, being only about a foot in length; it resembles the American sparrow hawk in size and color, and, like it, is beneficial to agriculture. In the days of falconry, this bird was used only by the lower classes, a custom which gave rise to the term *kestrel* as an expression of contempt. See FALCON; SPARROW HAWK. D.L.

Scientific Name. The kestrel belongs to the family *Falconidae*, and is known as *Falco tinnunculus*.

KETCHIKAN, *kech' ih kan*, ALASKA, a town described in the article on that territory.

KETCHUP, OR **CATSUP**, sauce introduced from the East and widely employed as a seasoning for gravies, meat, and fish. Formerly mushrooms constituted its chief ingredient, but now tomatoes (green and red), cucumbers, walnuts, apples, etc., are used in making a number of choice varieties.

A typical recipe is as follows:

Put into two quarts of tomato pulp, one onion cut fine, two tablespoonfuls of salt, and three tablespoonfuls of brown sugar. Boil until thick, then take from the fire, straining carefully until it is all through but the seeds. Return to the fire and add two tablespoonfuls of mustard, one of allspice, one of black pepper, and one of cinnamon, a teaspoonful of ground cloves, half a teaspoonful of cayenne pepper, one

grated nutmeg, and one pint of good vinegar. Boil together until it will just run from the mouth of a bottle. It should be stirred frequently so as not to burn. Seal tight while hot in large-mouthed bottles. For those who do not like highly seasoned foods, the quantity of spice in the recipe may be reduced.

The name ketchup is from the Malay word *kechap*. *Catchup* and *catsup* are English variations. E.V.M'C.

KETTLEDRUM. See DRUM.

KEUKA, *ke yu' kah*, LAKE. See NEW YORK (Lakes); SENECA LAKE.

KEWANEE, ILL. See ILLINOIS (back of map).

KEWEENAWAN, *ke we naw' an*, SERIES. See PROTEROZOIC ERA.

KEWEENAW PENINSULA. See MICHIGAN (Minerals).

KEY, *kee*, in modern music, a term designating the scale in which a composition is written. It comprises not only the tones of the staff itself, but all the chords constructed upon those tones. Each key is named for the keynote, or *tonic*, from which it is started, and there are as many keys as there are scales—twelve major and twelve minor. The key of C, having no sharps or flats, is called the *normal*, or *natural*, key. The name is also given in music to a mechanical contrivance for opening or closing certain sound holes on wind instruments, and to the levers composing the keyboards of pianos, organs, and other keyed instruments. See SCALE; MUSIC (A Course of Lessons).

KEY. See LOCK.

KEY, FRANCIS SCOTT (1780-1843), an American lawyer who is remembered solely because he wrote the inspiring verses that have become a favorite national hymn—*The*



Photos: Wide World; Rogers

MEMORIALS TO THE AUTHOR OF THE "STAR-SPANGLED BANNER"

At left, the home of Key, preserved in honor of the poet. Monument, at right, erected in Frederick, Md.

Star-Spangled Banner. Key was born in Frederick County, in Maryland, and was educated at Saint John's College, Annapolis. Beginning the practice of law in the town of Frederick, in 1801, he rose to the position of dis-



Photo: Brown Bros.

FRANCIS SCOTT KEY

trict attorney of the District of Columbia. He was living in Washington at the outbreak of the War of 1812, and it was during the defense of Fort McHenry, in Baltimore Harbor, that the episode occurred which occasioned the writing of the song that is now so dear to all patriotic Americans. The story is told in full in the article *STAR-SPANGLED BANNER*.

KEYSTONE, the brick or stone at the top of an arch, which, put in last, gives strength to the structure and is said to lock or key the whole together. In ancient Roman architecture, the keystone was usually carved or otherwise decorated. See *ARCH*; *BRIDGE* (Arch Bridges).

[Pennsylvania is often called the *Keystone State* because of its geographical position, being the seventh, or middle, of the thirteen original states of the Union. See *PENNSYLVANIA*.]

KEY WEST, FLA. See *FLORIDA* (back of map).

KEY WEST RAILROAD. See *FLORIDA* (Transportation and Commerce).

KHABAROVSK, *kah bah' rofsk*, SIBERIA. See *AMUR RIVER*.

KHADIJA, *kah de' jah*, the first wife of Mohammed (which see).

KHAKI, *kah' ke*, an earthen-colored fabric used for army uniforms. It was first used by British troops in 1857, at the time of the Sepoy Rebellion, but not until the South African War of 1899-1902 did it come into general use in the British army. It has been adopted as a service uniform by the American army, and is also used by civilians for work clothes. *Khaki* is a Hindu word meaning *dusty*, or *dust-colored*.

KHAMSIN, *kam'sin*, or *kahm seen'*, a hot wind which has its source in the Sahara and blows toward Egypt during the spring months. The name, from the Arab word for *fifty*, was given this wind because it usually blows for about fifty days, filling the air with hot, stinging sand.

R.H.W.

KHAN, *kahn*, or *kan*, a Persian word meaning *prince*, is a title given to Oriental rulers and commanders, particularly through Central Asia. In some places it is joined to the surname, and in others it indicates merely a man of rank. It is first found in manuscripts of A.D. 560. One of the most illustrious characters who have borne the title is the celebrated Genghis Khan (which see), the first conqueror of the Mongols.

KHAN-TENGRI, *kahn ten' gre*, a peak of the Tian-Shan Mountains (which see).

KHARKOV, *kahr' kofe*, capital of Ukraine (which see).

KHARTUM, *kahr' toom'*, the capital of Anglo-Egyptian Sudan (which see).

KHATMANDU, *kah' mahn du'*, the capital of Nepal (which see).

KHAYYAM, *ki' yahm*, OMAR. See *OMAR KHAYYAM*.

KHEDIVE, *keh deev'*, the official title of the ruler of Egypt while it was under Turkish domination. In 1867 the title was conferred by the Turkish sultan upon his subordinate, Ismail Pasha, the viceroy of Egypt, and became the recognized official title of the nominal ruler. Since the virtual independence of the country was proclaimed, in 1922, the title of the ruler has been king. See *EGYPT* (History).

Derivation. The word is derived from the Persian *khidiv*, meaning *sovereign*. This is a more dignified title than the former one of *vali*, which means *viceroy*.

KHINGAN MOUNTAINS. See *MONGOLIA*.

KHITAI. See *CATHAY*.

KHIVA, *ke' vah*. See *UZBEK*.

KHUFU, *koo' foo*. See *CHEOPS*.

KHYBER, ki' bur, PASS, the most remarkable pass in the world, geographically, and historically the most important with the pos-



Photo: O R O C

SCENE IN KHYBER PASS

A fortified village of a family group on the border of Afghanistan, in the Khyber Pass, on the frontier of British India. Each family has its own little fortress and watch tower as a protection against hostile neighbors. Blood feuds excite the people continually.

sible exception of Thermopylae. It is situated in Northwest India, and connects the Punjab with Afghanistan. Only ten feet wide at the narrowest point, it is about thirty-three miles long. The pass is the only practicable route between India and Afghanistan for travelers, caravans, artillery, or railroad, and its strategic importance dates from the days of Alexander the Great. It is declared there can be no land invasion of Great Britain's rich Indian Empire so long as Khyber Pass can be successfully defended. Travelers are protected from lurking bandits by armed police under the control of the king of Afghanistan; however, the guards are stationed there only twice a week, and entrance is forbidden on other days. A railway was completed to the head of the pass in 1925, but no railroad actually enters the country of the Afghans. See **AFGHANISTAN**.

KIAMICHI, *ke ah me' che*, **RIVER**. See **OKLAHOMA** (Rivers and Lakes).

KIAO-CHOW, *kyou' cho'*. See **SHANTUNG**.

KIBO. See **KILIMANJARO**.

KICKAPOO. See **INDIANS, AMERICAN** (Most Important Tribes).

KID, the technical name of a goat under one year of age. See **GOAT**.

KIDD, **WILLIAM** (1650-1701). Many fanciful tales have pictured the reckless and ruthless deeds of the notorious pirate Captain Kidd. This famous character was an able British navigator who had distinguished him-

self for bravery in the wars of his country against France. He was born at Greenock, Scotland, the son of a Scotch minister, and went to sea at an early age. As a young man he was commander of a commissioned British vessel in the West Indies, operating against his country's enemy, France. In 1695 he received a commission to pursue and capture pirates on the high seas, and in 1696, as commander of the galley *Adventure*, carrying thirty guns and a crew of eighty men, he sailed from Plymouth, England, to New York, where he increased his crew and then proceeded to Madagascar.

It was soon reported that Captain Kidd was practicing piracy instead of suppressing it, and when he returned to Boston, in 1699, he was arrested. The immediate charge against him was that of murder, for he had killed a gunner of the *Adventure* during a mutiny. He was sent to England, where he was tried, condemned, and executed. The treasure which he had secured during his unlawful career and had buried on Gardiner's Island, N. Y., was secured by the colonial authorities in 1699. For many years, tales of still greater buried treasure which the authorities had failed to find stirred men's imaginations, but eventually attempts to find it ceased.

In a book entitled *The Real Captain Kidd, A Vindication*, written by Sir Cornelius Neale Dalton and published in 1911, a defense is presented for the purpose of clearing Kidd's

name of the charges for which he was condemned. It is represented that Kidd was in the employ of "Persons of Quality" in England, and that his exploits were a faithful attempt to carry out his commission and further the interests of his employers. Historical documents and other data are presented which throw much light on the career of this picturesque figure. There is no doubt that many of the deeds attributed to him were purely imaginary.

In Literature. The adventures of Captain Kidd inspired many romances, notably Poe's *The Gold Bug* and Robert Louis Stevenson's *Treasure Island*.

KIDNAPING, *kid' nap ing*, also spelled **KIDNAPPING**, is a term which refers to the act of taking possession of a person and depriving him of his freedom. The word originated with the slang words *kid*, meaning *child*, and *nab*, a low term for *steal*. Formerly, it applied to children only, but it is now used also in cases where adults are taken and secreted. Merely enticing a person with promises does not constitute kidnaping, but seizing and detaining him by force or fraud, against his will, make the act a crime. All civilized countries have laws defining kidnaping and fixing heavy penalties for those convicted of the crime. See **ABDUCTION**.

KIDNEYS, *kid' niz*, two large filter glands located in the small of the back, one on either side of the backbone. They extend downward

small tubes about the size of the quill of a crow's feather, the *ureters*, carry the waste matter from the kidneys to the bladder, a large oval pouch lying low in the pelvis. Urine is expelled from the bladder through the *urethra*.

These important filtering organs are shaped much like beans, with the concave or depressed side of each inward, and the convex side outward. They are about four inches long, two and one-half inches wide, and one and one-half inches thick, and are purplish-brown in color. Each contains a network of tiny blood vessels which are twined around millions of kidney tubes; it is here that the waste products are withdrawn from the blood.

Diseases of the Kidneys. As the kidneys in health pour out from three to four pints of urine every day, anything that interferes with their work of excretion is liable to cause an accumulation of poisons in the body. Diseases of the kidneys are therefore a matter of grave concern.

There have been various tests devised to determine whether the kidneys are damaged or not. Those used by physicians to-day include tests which—

- (1) Determine whether any waste products are being retained in the blood which the kidneys should be excreting, urea being the most important of these;
- (2) Determine whether the kidneys are excreting as much fluid as they should;
- (3) Determine whether the urine which the kidneys are putting out is of a normal character.

The causes of nephritis (Bright's disease) are obscure. Sometimes the kidneys become diseased because of failure of the skin to take care of its work of excretion; as a result, they have an extra amount of labor thrown upon them. Every person should help the kidneys do their work by keeping the pores of the skin clean and healthy. The germs of various infectious diseases, including scarlet and typhoid fevers, tuberculosis, and grippe, are an important source of kidney trouble. Arteriosclerosis produces one type of kidney trouble. The habitual use of alcohol may also have a harmful effect on these organs. Severe kidney trouble, no matter what its cause, is known to most people as Bright's disease. K.A.E.

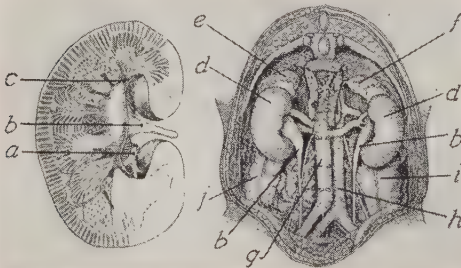
Related Subjects. A wider view of the importance of the kidneys will be obtained by reference to the following articles in these volumes:

Baths and Bathing	Gout
Bright's Disease	Urine

KIEL, *keel*. See **GERMANY** (Principal Cities).

KIEL, **TREATY OF**. See **NORWAY** (History: Loss of Independence).

KIEL CANAL, referred to also as **KAISER WILHELM CANAL**, is a notable German waterway. It extends in a northeast-southwest direction across the lower part of the peninsula of Schleswig-Holstein, connecting the



CROSS SECTION OF A KIDNEY AND LOCATION OF THE KIDNEYS

- | | |
|----------------------------|----------------------|
| (a) Branch of renal artery | (f) Liver |
| (b) Ureter | (g) Aorta |
| (c) Renal calyx | (h) Vena cava |
| (d) Kidney | (i) Ascending colon |
| (e) Spleen | (j) Descending colon |

from the eleventh rib to the highest point of the hip bones, the right kidney being placed a little lower than the left, to make room for the liver. Their function is to separate from the blood, urea and other waste materials which are excreted from the body in the form of urine. Blood is carried to the kidneys through the *renal artery*, and returns to the heart through the *renal vein* and the lower *vena cava*. Two

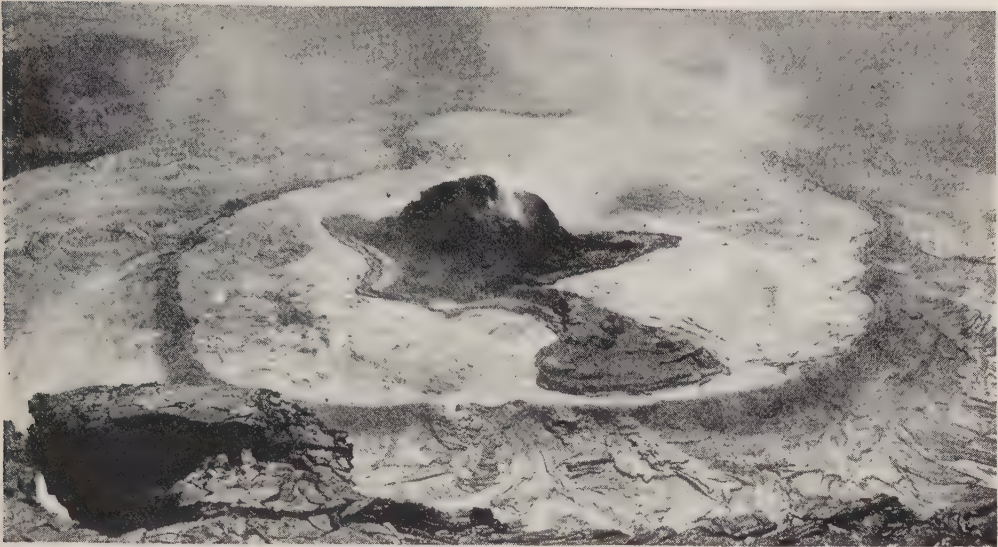


Photo: U & I

THE SEETHING CRATER OF KILAUEA

Baltic and the North seas. Its length is a little over sixty miles, and it shortens by 200 miles the trip around Denmark. At the eastern end, on the Baltic Sea, is Schönberg, close to Kiel; the latter was the naval station of the former German Empire. At the western end,

when finished, in 1895, was 190 feet wide at the surface and 29.5 feet deep. When dreadnaughts were built for the navy, it was found the canal was not large enough to accommodate them. Accordingly, it was enlarged, being made 140 feet wide at the bottom, 330 feet wide at the surface, and thirty-six feet deep, so that the largest warships could pass through. After the second completion of the canal, it was formally opened by Emperor William II on June 24, 1914, six weeks before the World War began. After the war, the peace conference ordered the canal internationalized; that is, opened to all nations on equal terms. See GERMANY (Transportation and Commerce).

KIESELGUHR, *ke' zel goor*. See DYNAMITE.

KIEV, *ke' yef*. See UKRAINE (The Cities).

KILAUEA, *ke lou a' ah*, a continuously active volcano in the southern end of the island of Hawaii, on the eastern slope of the larger volcano of Mauna Loa (which see). Since August, 1916, it has been a part of the Hawaiian National Park. Kilauea has the largest active crater in the world, a great hole in the mountainside, three miles long, two miles wide, and from 200 to 700 feet deep. In the southwestern part of this huge crater is a pit or lake of boiling lava, which the natives call the "House of Everlasting Fire." Sometimes this lava sinks suddenly to a depth of 1,000 feet; again it rises almost to the surface of the crater; but always its thickly bubbling mass, across which play streaks of fire and from which rise, from time to time, blazing fountains, affords an awesome sight. In times of activity, the whole floor of the crater becomes fluid, and the lava pours out through cracks in the wall and flows down toward the



KIEL CANAL, OR KAISER WILHELM CANAL

which opens into the mouth of the Elbe River, is Brunsbüttel, near a pre-war naval base at Wilhelmshaven. The ports are connected by rail with the large manufacturing cities of the country. Four gigantic railroad bridges cross the canal; these are so high that the largest vessels can pass under them.

History. The first work on the canal, whose future advantage was foreseen by Bismarck, cost \$39,000,000. It was begun in 1887, and

sea. Such eruptions occurred in 1823, 1832, 1840, and 1868, and more violent explosions took place in 1789 and 1924. These outbursts seem to have no connection with those of neighboring Mauna Loa. See HAWAII (The Land).

KILIMANJARO, *kil e mahn jah' ro*, an extinct volcano in East Africa, about 100 miles inland from Mombasa, with double peaks named Kibo and Mawenzi. Kibo, rising 19,320 feet above sea level, has a summit crater about 600 feet deep, and is the highest point on the continent; the other peak reaches a height of 17,570 feet. All vegetation ceases at 14,500 feet, while several large glaciers have been found near the top. Hans Meyer, who ascended the mountain in 1889, was the first man to reach the summit.

KILKENNY. See IRELAND (The Cities).

KILLARNEY, *kil lahr' nie*, a city in the Irish Free State. See IRELAND (The Cities).

KILLARNEY, LAKES OF. The famous Lakes of Killarney, three in number, are situated two miles from the town of the same name in Ireland, in the midst of the Kerry Mountains. They are connected with each other by a beautiful winding stream, and drain into the Laune River to Castlemain Harbor. Lough Leane, the lower lake, covers over 5,000 acres, and is studded with many wooded isles. Ross Island, the largest, is the seat of Ross Castle, the stronghold of the O'Donoghues of a past day. On Innisfallen is a ruin of an abbey founded in the sixth century by Saint Finian, a leper. The upper lake covers 430 acres, and between the two is Lough Torc, covering 680 acres. Muckross Abbey, founded by the Franciscans in 1440, is situated between Torc and Leane.

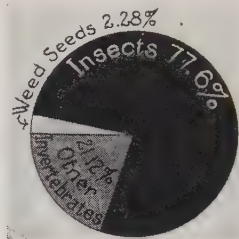


Photo: Visual Education Service

KILLDEER AND NEST

KILLDEER, the best-known American plover, common throughout North America from Newfoundland and Manitoba southward. It is so named from its loud and penetrating call,

which sounds like *kill-deer, kill-deer*. The killdeer is a noisy, restless bird, and while nesting takes fright and screams at the slightest sound. To attract attention to itself and away from its nest, it will feign lameness, and go limping along, dragging one wing. Killdeers are waders, but often nest in fields or pastures, and sometimes come close to houses. The nest is merely a hollow in the ground. Four black-spotted, buff-colored eggs are laid. The birds are beneficial because they feed on injurious insects, and deserve the protection afforded them by game laws. SEE PLOVER. D.L.



THE KILLDEER'S FOOD

Scientific Name. The killdeer belongs to the family *Charadriidae*. It is known as *Oxyechus vociferus*.

KILLER WHALE. See GRAMPUS.

KILLINGTON PEAK. See VERMONT (The Land).

KILMER, JOYCE (1886-1918), an American poet and journalist, famous as the author of the beautiful poem *Trees*. He was born at Brunswick, N. J., and educated at Rutgers College and Columbia University. After teaching for a time, he entered newspaper work in New York City, soon becoming a well-known contributor to many newspapers and magazines, but being distinguished particularly for his verse. He was killed in France in the fighting along the Ourcq, on July 30, 1918.

His *Trees* is quoted all over the world. Shortly before his death, a fellow soldier who did not know him said, "Say, do you know that poem about a tree?" and began to recite it. Kilmer finished it. The entire poem follows:

Trees

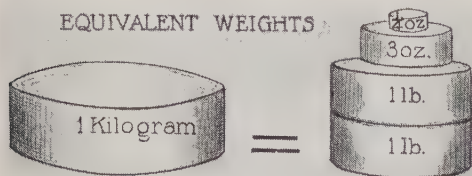
I think that I shall never see
A poem lovely as a tree;
A tree whose hungry mouth is pressed
Against the earth's sweet flowing breast;
A tree that looks at God all day
And lifts her leafy arms to pray;
A tree that may in summer wear
A nest of robins in her hair;
Upon whose bosom snow has lain;
Who intimately lives with rain.
Poems are made by fools like me,
But only God can make a tree.

Published Works. His volumes of verse include *Summer and Love*, *Main Street and Other Poems*, *Trees and Other Poems*. A friend, R. C. Halliday, has edited *Joyce Kilmer: Poems, Essays, and Letters*.

KILN, *kil*, or *kiln*. See BRICK AND BRICK-LAYING; CHINA PAINTING.

KILOCYCLE. See RADIO COMMUNICATION.

KILOGRAM, a standard of mass in the metric system of weights and measures, equal to 1,000 grams, or approximately 2.2 pounds.



The metric system of weights is now the standard in all of Europe excepting Great Britain. In the United States and Canada, it is still confined almost exclusively to scientific work, although it is used largely in the collection of customs duties. See **METRIC SYSTEM**, for extended comparisons.

KILOGRAMMETER, *kil' o gram me tur*, a unit of measurement in the metric system. It is the measure of the work done in raising one kilogram of matter (2.2 pounds) one meter (about 39 inches) against the force of gravity, and is equal to about 7.233 foot-pounds, a foot-pound being the work done in raising a one-pound weight one foot against the force of gravity (see **FOOT-POUND**). Except in the scientist's laboratory, the kilogrammeter is not used to any extent in America. See **METRIC SYSTEM**.

KILOLITER, *kil' o le tur*. See **METRIC SYSTEM**.

KILOMETER, one thousand meters in the metric system of measurement, each meter representing practically 39.37 inches. It is equal to five-eighths of a statute mile. In the United States and Canada, the term was once confined largely to scientific writings, but is now encountered with some frequency in newspapers and other works of a non-scientific character. Especially after the outbreak of the World War, in 1914, did the word assume importance to readers of newspapers, for the rate of advance or retreat of armies was announced in kilometers instead of miles. An advance of ten kilometers meant practically one of six miles. See **METER**; **METRIC SYSTEM**.

KILOWATT, *kil' o walt*, the practical unit of measurement of electrical energy, in universal use even in such countries as have not generally adopted the metric system. The kilowatt equals 1,000 watts, a watt being the power required to keep a current of one ampere flowing under a pressure of one volt. Mathematically, *watts equal amperes times volts*. Since it requires 746 watts to equal a

horse power, the larger unit, the kilowatt, is the one commonly employed in practical work. The electric unit was named in honor of James Watt, a Scotch engineer who did much to perfect the steam engine. H.S.E.

Related Subjects. The reader is referred in these volumes to the following articles:

Ampere	Volt
Electricity	Watt

KILPATRICK, HUGH JUDSON (1836-1881), a cavalry leader and major general in the Federal armies in the War of Secession. He was a native of New Jersey, was graduated at West Point Military Academy in 1861, and at once became captain of Duryea's Zouaves, a New York regiment. Kilpatrick fought from Bull Run to Gettysburg in the campaigns in the East, and had an important part in the final battles in Virginia. After the war, he was twice United States minister to Chile. (1865-1868 and 1881).

KIMBERLEY, *kim' bur lie*, a city in South Africa, in the province of Cape of Good Hope. It was founded in 1870, and owes its existence and prosperity to the mining of diamonds, which began in that year. It is situated 647 miles northeast of Cape Town, near the border of the Orange Free State. Diamonds to the value of over \$300,000,000 have been mined around Kimberley. During the South African War, the town was besieged by the Boers for 123 days; it was relieved by General Sir John French in February, 1900. The population is 41,000, of whom 19,000 are white. See **DIAMOND**.

KIMONO, a Japanese garment. See **JAPAN** (Mode of Life).

KIN, NEXT OF, a legal phrase denoting the blood relations of one who has died intestate, or blood relations nearest in degree, according to the laws of the several states. Each jurisdiction determines the right of heirs at law, in case one dies without leaving a will. Usually, in the latter case, a widow takes one-third of the estate if there are descendants, or one-half if there are none. The rest is given to the next of kin, children and their issue coming next, and grandchildren taking their share of the predeceased parent. The father succeeds to the whole if there are no descendants. The laws of inheritance are complicated, and while the foregoing represents the English common law, each state specifically determines who shall inherit. See **INTESTACY**.

KINCHINJUNGA, OR **KANCHANJANGA**, the third highest mountain in the world, is a peak in the towering Himalaya chain, and is about one hundred miles east of earth's supreme height, Mount Everest. The tip of Kinchinjunga is 28,156 feet above sea level. The mountain is on the boundary between Nepal and Sikkim.

1 Mile	_____
1 Kilometer	_____

COMPARATIVE DISTANCES



KINDERGARTEN. This institution was devised by Friedrich Froebel in Blankenburg, Germany, in 1837, to meet the needs of children below the school age, and to furnish a natural basis for their later education through the agency of books. The name, which signifies a *garden of children*, implies that education is primarily a process of development, rather than one of mere learning, and that this development can be directed by providing right conditions and the guidance of a person trained for the task. Froebel believed that such an institution was needed to supplement the home, since the child has needs during this period which the home can but partially meet, and which the school does not recognize.

These needs arise from the development of the child's play instincts, and require, for their full satisfaction, the companionship of children of his own age, and the opportunity for experimentation in larger variety than the home can furnish. The kindergarten, therefore, fills the gap that exists between the home and the school. That its work furnishes a real basis for that of the grades has been confirmed by practical experience, as well as by more recent study of the child's development. As a result, the kindergarten has been adopted by all progressive countries, in a greater or less degree.

A Kindergarten Visited. The purpose and method of the kindergarten can be most readily understood by a consideration of its daily procedure. An imaginary visit will assist in making its purposes clear. The visitor does not wonder that the children enjoy a place with so homelike an atmosphere. Here, on each side of a fireplace, are low cupboards that contain quantities of play material of different kinds, and at each end of the room are several small tables, put together so as to form a large one, upon which the children use the material. Under the window seats of the large bay window are drawers filled with picture books and mounted pictures which the children are free

to use at certain times. On the opposite side of the room is the piano, and at the end opposite the fireplace is a sand table. Under two of the windows are plant stands, on which are boxes filled with ferns or blooming plants. Over the fireplace hangs a *Sistine Madonna*, and on the walls are pictures of children at play.

The room shows many evidences of the children's recent efforts. On a small table is a collection of fall fruits and vegetables, which they modeled the week before and painted in appropriate colors. On a window sill is a tray of envelopes made by the children, to hold the assortment of seeds they have collected for their spring planting. On a screen is a festoon of autumn leaves, and paper cuttings of leaves of different kinds. The ledge above the blackboard is decorated with sprays of bittersweet leaves and berries, and below it hang festoons made of rose hips and pumpkin seeds in alternation. On the mantel is a vase containing barberry twigs with their brown leaves and scarlet berries, and on the piano is another containing milkweed stalks, with the pods just bursting into feathery whiteness. The decorative material the children have gathered on their walks to the near-by gardens, fields, and roadsides, along with the vegetables, seeds, and fruits, is a part of the harvest which the autumn brings—the harvest of beauty which has been used for the adornment of their play room in ways of their own suggesting. It is evident that through their play the children have shared in the thought and effort of mankind during the autumn season.

The Program of Exercises. The work of the morning gives further evidence of their participation in the thought of the season. At a signal, the children bring their chairs to the circle for the opening period of conversation, song, and story. The song of greeting is followed by several autumn songs of their own choosing. Since it is Monday, the children are bubbling over with stories of their week-end

experiences, which they are encouraged to tell. The kindergartner tries to connect each child's contribution with some phase of his previous work or play. In order to connect the children's thought of the country more closely with their own lives, she tells a story of the little boy who learned that, although the farmer took many things from the farm to the city children, he always had to take back from the city some things that his children at home needed. She then asks the children whether they would like to tell this story with their blocks. The suggestion meets with ready assent.

Since the period of conversation and story has occupied nearly half an hour, a period of games follows, that the children may have opportunity for exercise before proceeding with their building. In this, the memory of a park playground apparently lingers in the children's minds, as the merry-go-round is the first game asked for. In playing, the children form two circles, one within the other, both facing inward. The children in the inner circle join hands and form the merry-go-round, while those on the outer circle "ride," each one placing his hands on the shoulders of a child in the inner circle, ready for the dancing around the circle together. This suggests the dancing of the leaves, as the next game asked for is "Like a Leaf or Feather," in which the children imitate dancing leaves. A sense game with fruits and vegetables follows, and "The Apple Man" brings the period to a close.

The children now form into two groups, one of which goes to the farther table to continue work upon several sets of doll furniture, to be used in the near future for the furnishing of a doll house. The children in the remaining group move the small tables away, leaving a clear floor space across the end of the room. Six of the children are selected to make the farmer's fields and buildings at one end of the space, while the others build the city houses and stores at the other end. The children get from the cupboards the enlarged fifth and sixth gift blocks, and begin their building on the floor. Since they have used this material many times, it is not long before the farm buildings are ready in the one space, and the city street, with homes and stores, in the other. The children then represent the farmer taking his produce to the city, by means of a toy horse and wagon, and his returning to his home with his wagon laden with articles from the city stores. The other group of children is invited to see the city and country picture. The "picture" in question is left on the floor to be enjoyed further. The session closes with a period of songs, finger rhymes, and stories retold by the children.

Some Conclusions. From such a morning's work, the thoughtful observer cannot fail to

draw several conclusions. The first one is that the children's happiness in their work and play must have its source in the satisfaction of certain fundamental needs—the companionship of their equals, and occupation in line with their interest and ability. Another conclusion is that the child gardener needs thorough and varied training in order to know how to utilize the children's play interests in such a manner as to further their progressive development. In order to do this successfully, she must observe their unguided play, for the purpose of discovering their native interests, to the end that she may wisely plan her work for them. A further conclusion is that, since children's needs vary, several lines of work are required to satisfy them, and these, woven together informally, constitute the kindergarten program of exercises.

From the program described, it is evident that nature observation was emphasized, and also that certain observations formed the thought basis of the work done. The different lines of work carried out—the play with material, the games, the songs, and the stories—all served as means of expression of the children's thought.

How It Meets the Children's Needs. To understand the true significance of the kindergarten, it is necessary to consider the means and methods by which it meets the children's varying needs.

Among these, the need for companionship with children of the same age is one of the most insistent. In the home, the child is too often either a monarch or a subject. In the kindergarten, he is an individual among his equals. From his play there—at one time with a little group, perhaps of his own choosing, and at another as a member of the whole—he experiences the joy of mingling with his fellows and is stimulated to his best effort by the opportunity for comparing his own achievements with those of his companions. The joys of companionship are often interrupted, however, because the members of the little company have not yet learned the laws of right conduct. The children learn these laws readily, however, by the experience of losing favor with their playmates if they offend. It is through such experiences that they come to realize right conduct as a means to a desirable end—happiness in their play together. Many of the kindergarten exercises afford opportunity to prove this, but none more so than the games, because they are so largely coöperative.

Some Purposes of the Games. It is because the games meet so many of the children's needs that they deserve especial attention. The period from three to six years is one of such rapid growth that energy is generated faster than it can be used. This is the reason why children run, jump, and dance in sheer joy in



A PARK ON THE SAND TABLE

the activity. It is for the purpose of affording the right exercise for this overflowing energy, which cannot be repressed without injury, that the various running, skipping, and dancing games have been evolved. Since these are necessarily rhythmic, they not only aid the children in gaining control over their movements, but become the means by which they learn to understand and express music on its rhythmic side.

To give opportunity for such expression, exercises in which children "do what the piano tells them to do," that is, march, skip, dance, or run, have come into vogue. With such exercises as a basis, the children have no difficulty in learning the games of another group—those in which they dramatize the activities of adults—of the mother in the home, the farmer in the field, or the carpenter or blacksmith in his shop. These not only satisfy the imitative instinct, but acquaint children with fundamental forms of human effort, and the place and value of these in life. They have, therefore, a double social value—that gained from a knowledge of the activities imitated, and from the children's playing them together.

No list of kindergarten games could be considered complete that did not include still other games—those in which children measure their strength, skill, or alertness with that of others. Of these, such games as "Drop the

Handkerchief," "Dodge Ball," and the many sense games and hiding games are examples. These serve to stimulate children in new ways and contribute a new element to their enjoyment. In view of the varying needs which the games meet as a whole, and the opportunity for happy comradeship which they afford, it is not surprising that they should be rated among the most valuable of the agencies which the kindergarten employs for the child's development.

Purposes of the Work with Materials. Because it furnishes the child with occupation as well as companionship, the kindergarten meets another of his fundamental needs. It does this by means of its organized play material. This was originally devised by Froebel, but has been improved in recent years, as the result of a better understanding of the child's development. It consists of a series of educative playthings, which Froebel termed "gifts," and plastic materials, such as sand, clay, paper, etc., by means of which the children can carry out their own play motives. The gifts consist of a set of balls, one of each of the six standard colors; of a set of the fundamental forms—the sphere, cube, and cylinder; of four sets of cubes, each differently divided for building purposes; and of several series of tablets, sticks, rings, and lentils for plat representation. The plastic materials—sand, clay, paper, etc.—are used for modeling, folding, cutting, and weav-

ing. These lines of work Froebel designated as occupations. The gifts and occupations were intended to complement each other and to form a system of play material. The general purpose is to provide material that will keep pace with the child's advancing intelligence by its own increasing complexity.

The play with this material satisfies the kindergarten child, because it gives him the opportunity to experiment and to carry out his own play purposes. The material can be used in numberless ways. If the kindergartner wishes to gain an insight into the interests and abilities of the different children, she allows them to choose their material and the use they wish to make of it. Equipped with such knowledge, she can plan work that will satisfy them and lead in right directions.

If she wishes to know how fully the children have grasped the essential features of a house, and what power they have of expressing this, she will give them all the same material, and ask each one to build a house in his own way. When the houses are completed, they are examined and their merits discussed. Because of the excellence of some one house, the children may all wish to build one like it. If the children's technique needs improving, the kindergartner may direct the work, calling attention to the way in which the blocks are placed to produce the best effect. If the children had difficulty in making some portion of the house, such as the roof, an exercise in the making of this would be likely to follow in the near future.

At another time, a few children may be selected to work out an idea together—a garden or park on the sand table, perhaps. In this, the children agree upon the general plan of the representation, the best material to use, and the part that each is to take. In the process, however, the children may discover the need of additional material—blocks for a seat, colored lentils to represent the flowers in a bed, or paper to represent a tree in some way. Such an exercise leads to the doing of other and related things, such as the modeling of vegetables or the making of folders to contain garden pictures. These are a few of the many ways in which the children use the materials to work out their own play interests. The work satisfies them, because it affords opportunity both for individual effort and for effort in common.

Other Needs Which the Kindergarten Meets. The child from three to six years has other needs which the kindergarten meets. One of these is the need for out-of-door work and play. For this the garden and nature excursions, to which many references have been made, furnish the best agencies. Owing to climatic conditions and the lack of space, the outdoor garden work is difficult, if not impossible, in

large cities. Outdoor games and walks are possible at certain seasons, and a knowledge of gardens, fields, and roadsides, with the plant life common to them, can be gained in this way. They also afford an opportunity for a knowledge of bird life, and of such pets as children in the neighborhood may have. Such knowledge is indispensable as a basis for several lines of work with the material. It is the care of plants and pets that children need to develop—the right attitude toward living things. In most kindergartens, the plants in the kindergarten window box, the seeds which the children plant in spring, and the goldfish in a globe are the only means by which the attitude can be cultivated.

During the kindergarten years, the children have another need that should be met. This is the need for a vocabulary. Because the kindergarten insists upon observation and experience as a basis for expression through materials, it provides at the same time an admirable basis for expression by means of speech. In their out-of-door observation and their play with material, words are constantly associated with objects and actions, and the expression of thought in words is a matter of course. In the morning circle, the children tell of their home experiences and talk over with the kindergartner the things they have seen and done, or that they plan to do together. Sometimes pictures serve to call out stories of their recent experiences, and finger rhymes are taught to help them keep an experience in mind. The story-telling and the children's reproduction of the stories are additional means by which language is acquired and the introduction to literature is made.

Children wish to sing, even before their voices have evolved from the monotone stage, and it is important that they should have the right beginning in song. Through the selection of songs that appeal to children's interest, the skilful kindergartner helps them to gain control of their voices and to sing with pleasing effect. She believes that the little repertoire of songs, which she teaches them to sing as they might tell a story, will form a nucleus from which will develop a love for beautiful music. Because the importance of right beginning in music is increasingly appreciated, the musical work of the kindergarten has received increasing attention in recent years.

It is through the agencies mentioned—the games and songs, the play with material, the outdoor observation, and the stories and rhymes—that the kindergarten educates the child during the period when he needs a larger life than that of the home, and a freer one than the school is yet willing to accord him. The school itself has gradually adopted these agencies, however, and hence it recognizes their value in the kindergarten, and the sig-



EXAMPLES OF PAPER CUTTING

nificance of the kindergarten as a whole, as it did not in the earlier years. As a result, the kindergarten is being increasingly recognized as the true basis for the work that is to follow.

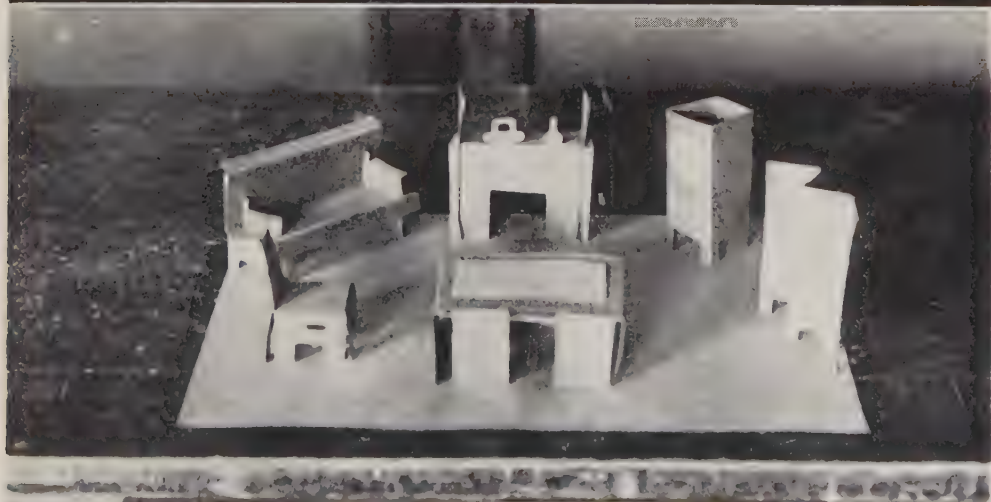
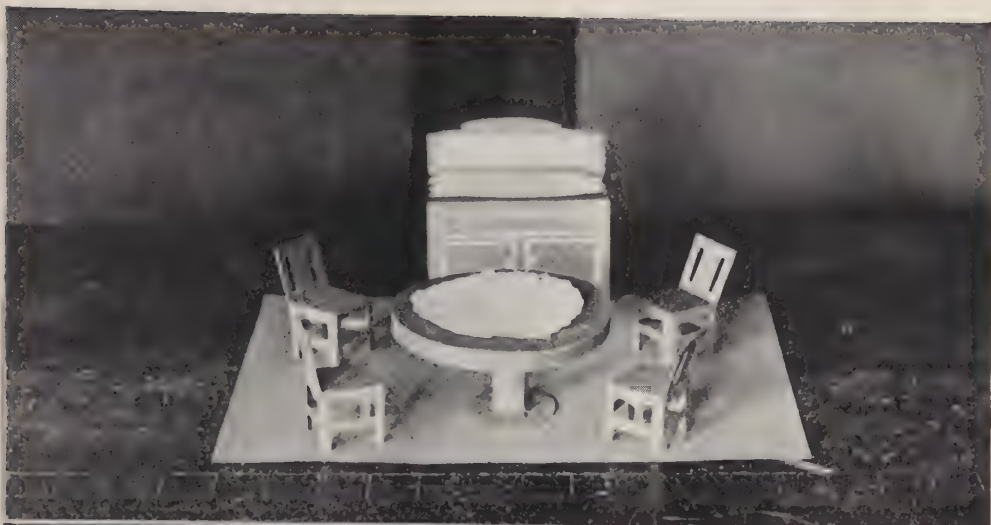
The Kindergarten in the Home

The mother who seeks help in meeting her children's play needs is often disappointed because suggestions intended to be of service contain no hint as to the age at which children can do certain things. The suggestions here made will therefore concern themselves first with the play and play material suited to children from two to four years of age; and second, with that of children from four to six years.

During the first of these periods, children's activity is primarily motor and sensory. It consists of running; climbing on chairs and couches, and down again; lifting and carrying objects from one place or room to another; and experimenting with objects, to see what can be done with them. The ideal play material,

therefore, consists of sand; balls of different kinds and colors; blocks of different shapes and sizes; wooden beads of different sizes for stringing; pegboards into which pegs may be fitted in different ways; one or more medium-sized and simply dressed dolls; and a few toy animals, such as a dog, cat, horse, and cow, preferably of rubber.

During the period of from four to six years, children use these materials in different ways, and, having gained control over their hands, can use also pencils, crayons, scissors, and sewing and weaving material. The children of both ages will derive greater pleasure and profit from the materials here suggested than from the customary ready-made toys, because of their greater possibilities of experimentation and arrangement. Because of their greater durability, the cost of the former will be less, also, in the long run. Because of the frequent references that will be made to the kindergarten material, it will be well for the mother to have on hand a catalog of kindergarten supplies.



Cardboard Construction for Doll House. Above: dining room furniture. Center: bedroom set. Below: living room furniture.

Play Material for Children from Two to Four Years. The toys that children of two can use are necessarily simple. The colored balls of the first kindergarten gift, and the blocks—a sphere, cube, and cylinder—of the second, are suited to this age. Children of three years will need many more blocks, however. This need can be supplied by the third kindergarten gift, which is a box of eight two-inch cubes. Since they will need more than this one box, it will be advisable to supplement these with a homemade set. This can be easily made from a piece of timber 2 x 4 inches, and 7 feet long. In order to have blocks of varying shapes and sizes, eight blocks 4 inches in length should be cut from this, and eight more, 2 inches in length. The remainder of the stick should be cut lengthwise, and each of the resulting strips cut into 2-inch blocks. This will make fifty-two blocks in all. If these are cut true and finished smoothly, they will serve children's play purposes admirably at this period.

Children of two and a half years or more also enjoy stringing the colored wooden beads that form a part of the kindergarten material. These are made in two sizes—one inch and one-half inch in diameter; and in three forms—spheres, cubes, and cylinders. They are listed in catalogs as "Mrs. Hailman's beads," and are put up in boxes containing different numbers and sizes. For home use, one box containing a gross of the half-inch size and another containing a gross of the inch size would be needed.

Another article much enjoyed by children of three is the pegboard—a board ten inches square, having 100 holes. With these go 100 pegs in six colors, each two inches long, to fit the holes.

To these materials, of interest to children because of the opportunity for experimentation which they afford, must be added another—perhaps the most valuable of all, but most difficult to provide—and that is sand. The other materials can be put away when not in use, but play in sand requires a table, and this is difficult to find a place for in the ordinary home, unless there is a special play room. If a play room cannot be provided, an effort should be made to have a sand box out-of-doors for summer use. The gain to children will more than compensate for the difficulty experienced in providing it.

Nature of the Child's Play from Two to Four Years. That the play of children of two and three years of age is largely experimental has already been stated. Their first play with sand, therefore, consists in piling it up into different shapes, shoveling it into a pail or box, pouring it out, and repeating the process, or making impressions of hands, blocks, or other objects. It is not until they are nearly

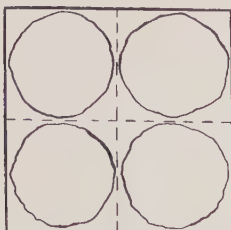
four that they attempt to represent anything, such as a garden or a yard. Their first play with blocks is of this character. They pile up the blocks into various shapes only to knock them down and build them up again. They also enjoy putting them into a basket or a small wagon and taking them to another part of the room or house, emptying them out and doing it over again. They do not, at first, represent things with blocks any more than they do with sand, but the piled-up blocks soon suggest houses or other objects, and then they attempt to make them. The sand and blocks together afford unlimited opportunities for play. With these, and with a simply dressed or rubber doll and a few toy animals, children will be happy for hours.

It is because the beads and pegboards also afford opportunities for experimentation that these give children great satisfaction. The first stringing of the beads will be mere experimenting with the colors, forms, and sizes, but the fact that more satisfactory results can be obtained by stringing them in some order will eventually dawn, and further efforts will show grouping in color, form, or number. It is because of their possibilities that children do not tire of them, and that they learn many facts of color, form, and number.

The mother who has grasped the principle of development through activity will see that children's play with this material has high value, unorganized though it may seem. She will, therefore, see the necessity of providing a place where the children may carry it on with comfort. It is not possible for every home to have a room only for play purposes. There are few homes, however, in which a portion of the living room or the dining room cannot be set apart for the children's play uses at certain periods. It is quite possible, too, for the mother to plan a general play program for the day, the noisiest kind coming when no one will be disturbed by it, and that of a quieter type at other periods. It is essential, too, that she provide a place in which the material may be kept. One way of doing this is to make one or more play or toy boxes out of soap boxes, by lining them on the inside and covering them on the outside with a pretty cretonne. By fastening the cover on with hinges, putting casters under it and handles like trunk handles at each end, a box is provided that will contain a whole set of blocks and other material, and the children themselves can easily move it from one part of the room to another.

It should be a part of the children's education to put the play material in its proper box after it has been used, and to return the box to its accustomed place, since the formation of habits of order is essential to their happiness. In this, as in other respects, play is but a means which the mother must utilize to ac-

FREE-HAND TEARING



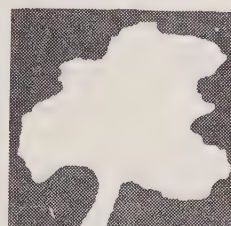
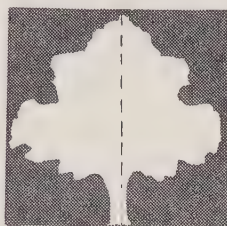
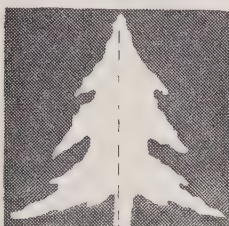
FOUR CIRCLES MADE BY FOLDING THE PAPER ONCE EACH WAY BEFORE TEARING



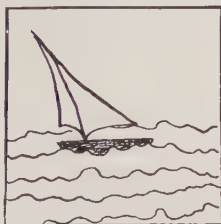
SNOW MAN MADE OF TORN PIECES, CRAYON USED TO MAKE HAT AND ARMS.



"A LITTLE BALL, A LARGER BALL
A GREAT BIG BALL I SEE
NOW LET US COUNT THE BALLS
WE'VE MADE,
ONE TWO, THREE."



WHOLE OBJECT TORN WITHOUT FOLD



THE WAVES ARE MADE BY PASTING ONE TORN STRIP OVER THE OTHER.



TREES MIGHT BE TORN FROM GREEN PAPER, HOUSE FROM RED - ETC. -

comply certain ends. The Froebelian material has possibilities that the customary toys lack, but these possibilities cannot be realized without the mother's coöperation and direction. She must, therefore, watch the children's play, and utilize the opportunities which it presents for teaching courtesy and regard for the rights of playmates or members of the family. She should note what children are able and unable to do with their bodies, their hands, and the material, so as to help them take the next step forward in these several lines. She should utilize the occasions which the material affords of teaching the names of objects played with and others in the room, and the color, size, form, and number of these. She should allow children to carry out their own play purposes as far as possible, however, and refrain from making suggestions until their own resources have been exhausted. It is in these and similar ways that the conditions for the children's complete development are met.

Play Material for Children from Four to Six Years. During the period from four to six years—the true play period—children begin to feel the need of companionship with others of their own age, and this need the home can but seldom supply. It is at this point that the kindergarten itself is needed. Several of the agencies which the kindergarten utilizes—the garden and nature work, stories, and music—the trained mother can utilize as effectively as can the kindergarten. The essence of kindergarten play is *togetherness*, however, and the child who misses this will lack something that cannot be made up to him. The mother's direction of the child's play, with material suited to his age, is the best substitute, however, and suggestions concerning the nature of such play are therefore in order.

Because children between the ages of four and six years have acquired a certain amount of knowledge and skill through such experimentation as that described, their play is of a

different character. If they use the same material, they now use it as means to an end—the carrying out of some purpose of their own. In his effort to carry out such purposes, however, the child may find that he needs a new kind of material—blocks with which he can make a sloping roof to a house.

Again, he may wish to make an object out of new material—from cardboard, instead of blocks, perhaps—but he does not know how. Or he finds it desirable to know how to do other things—to represent objects with pencil or scissors, or to beautify something he has made. He therefore becomes interested in new lines of work—drawing, modeling, cutting, or tearing, folding, and constructing, and perhaps sewing and weaving. For his additional building, he will need the enlarged fourth and fifth gifts, and, later, the sixth; and, for the hand-work, pencils, crayons, or paints, blunt-pointed scissors, paper and cardboard of different kinds, sewing and weaving material—just what and how much of each will depend upon the lines attempted. Work with these materials is not so easily carried on in the home as the work with sand, blocks, or beads. Several lines, in fact—clay-modeling, painting, and cardboard construction—would better not be attempted, unless the mother herself has had training in these, or has provided herself with a book, such as *What and How*, since the children cannot use them successfully without instruction.

Some of these lines of work, such as perforating, sewing on cardboard, and fine folding and weaving, are but seldom used in present-day kindergartens, because they produce nerve strain. It would be well for the home to note this suggestion and attempt only a few of the simpler lines. Children's desire to represent can be satisfied by the use of sticks, pencil and crayon drawings, and free-hand cutting or tearing; and their desire for construction, by evolving some of the simpler forms from cardboard foldings or from the utilizing of empty spool boxes. Assuming that the mother will wish to attempt some work in several of these lines, the following material is suggested:

Seventh-gift pasteboard tablets, one box of 100, form A, B, G.

Eighth-gift sticks, one box enlarged, uncolored sticks, 1 inch in length, and one each of 2 inches, 4 inches, and 6 inches in length; numbers 40, 41, 43, and 45.

Weaving mats, linen, 1 dozen $\frac{1}{2}$ -inch slits, No. 1231, and 1 weaving needle, No. 396.

Sewing cards, Miss Stodder's, 1 dozen, design to be selected; silkateen, 1 dozen spools, No. 195A; and needles, 1 paper, No. 199.

Crayons, one box kindergarten crayons, or Embeco crayons, No. 8100.

Paper for drawing, folding, or cutting; one ream No. 20 manila, 6x9 or 9x12 in. White shelf paper can be substituted for this, or the paper that can be purchased of any printer, cut to the desired size.

Paper for cardboard construction.

A blackboard.

A set of Bradley's Straight Line Picture Cutouts, No. 8216.

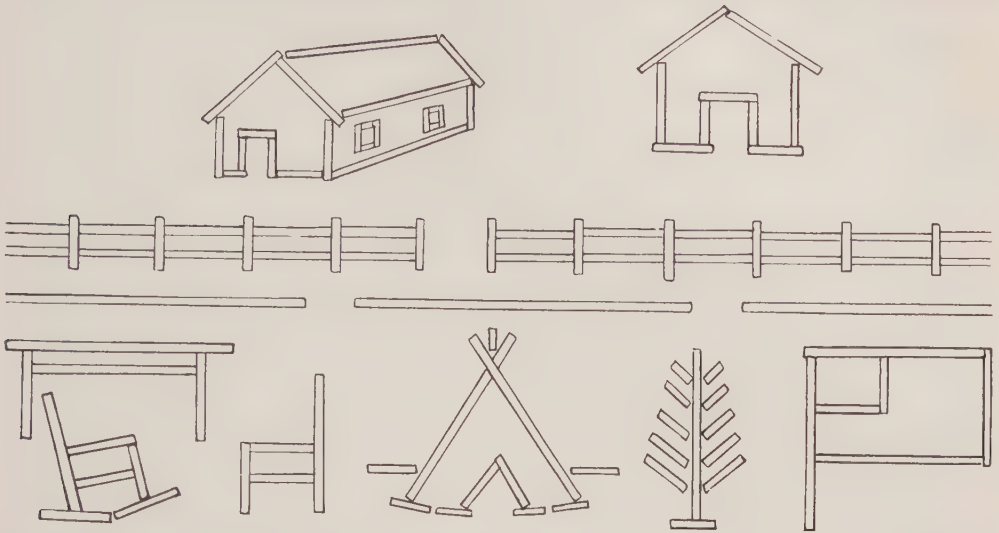
Suggestions for Work with the Material Named. Children's first attempts at free representation, by drawing, modeling, painting, cutting, etc., are as crude as their first efforts with sand and blocks. They will, therefore, need the stimulus of their mother's suggestion and encouragement to continue until their work is good. It will therefore be best to have them continue their play with the known material, making this more difficult, and to take up only one or two of the new lines at first—crayon-drawing and paper-cutting, perhaps—and introduce the others gradually. In the block-building, definite problems may be set, such as the building of a house with a definite floor space, a special kind of roof, or a certain number of windows. The pegs and beads may now be used in certain number combinations, or the stringing may be of corn and seeds, and with a thread and needle, instead of shoe laces.

The best start in drawing, cutting, or tearing will be made by the child's seeing his mother draw, cut, or tear a simple object. To sustain the interest in such work, it is well for the mother to help the child make a book, either from cloth or construction paper, in which to mount his best drawings and cuttings. These may include some pictures of fruit, or other objects cut from seed catalogs. The illustrations may suggest the uses and cover decorations of several such books. The children may keep these for their own pleasure, or use them for gifts to friends. In either case, they serve to organize the children's efforts, and make each day's work contribute toward an end they are carrying out. It is the having such an end that makes their work vital.

It is because children's play and work must have a relation to their own purposes, if it is to contribute to their real development, that the making and furnishing of a doll house is made much of in present-day kindergartens. Its value there is limited, however, because each child's part in the whole is so small. Because the child at home can have the main share in its making, a doll house made from a hat box or soap box should form a part of every child's play equipment. When the mat that he weaves is to be used as a rug, or the cardboard is to become the furniture, these objects and his work with them assume an interest which they did not have before. The boy who has built a barn and sheds in which to shelter his toy animals acquires an interest in these that will carry him forward to new things.

The Value of Home Play Depends Upon Parents' Attitude. The parents' attitude toward such play as this suggested will in a large

STICK LAYING



measure determine its value for the children. If they regard it as a means to the child's development, they will take pains to see that it is of the kind to develop resourcefulness and the habits of orderliness and consideration for the rights of others. They must be willing to let children form and carry out their own play projects, and refrain from overwhelming them with suggestions. One of the most important lessons for children to learn, however, is co-operation with others, on the basis of mutual rights. They must not, therefore, be allowed to usurp authority. Parents often fail to respect children's rights, but children as often fail to recognize that parents have rights also. The right to suitable play material and a place in which to use it is a right that should be conceded to children; but they should be taught from the beginning that the parents' rights may sometimes prevent the children's exercise of their own.

Parents should resist the temptations to buy expensive toys, since these defeat the purpose of education through activity, which is the development of resourcefulness and the enjoyment of simple, wholesome things. The holidays that give the children the greatest pleasure are those to which they contribute the most. A Christmas tree that contains decorations and gifts of the children's own making, to be given to the friends of their own choosing, will afford greater happiness than one that dazzles them with its glitter and overwhelms them with toys of which they can make no use.

It is in this spirit and to these ends that parents should direct their children's play. The play with material forms but one of several

agencies that contribute to their unfolding. Of the games that children enjoy so much in kindergarten, only the sense games, hiding games, and guessing games can be used in the home, since the essence of the others lies in the companionship of other children. In the absence of such companionship, the parents must contribute more of their own. By participating in their children's unfolding, the parents will themselves be the gainers, since the enriching of their children's lives will result in the enriching of their own.

Some Side Lights on the Kindergarten Movement

The kindergarten occupies a place of its own in American life and thought. It won that place by the demonstration of its value for little children. The recognition accorded it has increased, however, as the value of its principles for all education has become apparent. The doctrine that gives it this value is its conception of education as a process of development. It was because this doctrine was at such variance with the prevailing doctrine of education as a process of instruction that the kindergarten awakened such an interest when it first became known, in the decade from 1870 to 1880. It was because a few people at once recognized the doctrine of development as the true one that the kindergarten found advocates from the beginning, and it was because they saw in it an agency for the spread of the new doctrine that they worked for its advancement. In the progress of education, therefore, the kindergarten has been both the

source and the consequence of the accepting of the new educational ideals. So closely interwoven has the kindergarten been with the improvement of general education that the two can only be considered as parts of the same story. The story is an interesting one, but too long for these pages. A few significant points, however, must be noted in passing.

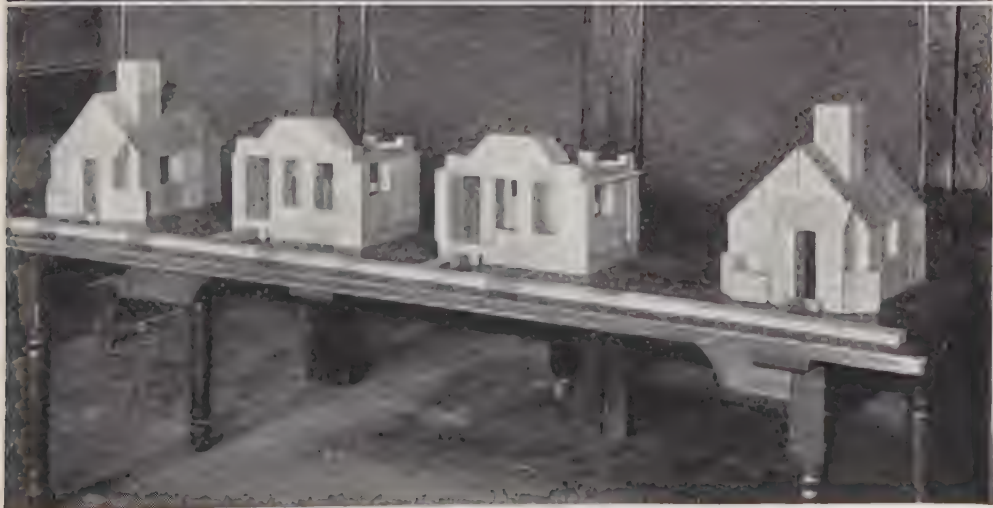
Woman's Work for Kindergarten Advancement. The kindergarten movement has been called a woman's movement, because of the part that women have taken in its advancement. The efforts of women have contributed greatly to its success, but it has not been a woman's movement alone. Among the leading educators who endorsed it from the beginning was William T. Harris, who, as superintendent of schools in Saint Louis, in 1873, gave the kindergarten its first trial in the school system. This centered the interest of educators upon it. Next in their interest in the new movement were the mothers of young children, who instinctively recognized that a doctrine so in accord with the nature of childhood must be the true one. Believing that an institution which so interpreted childhood must have a value for mothers as well as for children, they added their influence to that of the educators, urging the study of its doctrines and the adoption of the institution. As a result of the efforts of its increasing numbers of friends, a model kindergarten was made a feature of the Philadelphia Exposition in 1876, and in this way, it became generally known. That its message of a higher type of education for young children was understood and accepted is proved by the increase in the number of kindergartens—from ten in 1870 to 400 in 1880.

The growth of the kindergarten movement from these beginnings was brought about by many influences that cannot be traced here. At this time, however—about 1880—the interest of the women took organized form and became an important factor in its development. Realizing that the kindergarten would not be generally adopted unless the people were made acquainted with its purposes and methods, public-spirited women in many communities organized kindergarten associations for the spread of kindergarten intelligence. The work of these associations included the planning of campaigns for the public's enlightenment, the raising of money for kindergarten support, the holding of mothers' meetings and the formation of kindergarten study clubs, the coöperation with school authorities, and other forms of publicity work. These associations, which were organized in several hundred cities and towns during the decade from 1880 to 1890, formed one of the chief agencies through which the people became acquainted with the kindergarten, and it was to the knowledge thus gained that its adoption by schools later was

largely due. The kindergarten would doubtless have made progress without that effort, but by means of it, the clock of educational progress was set forward many years. Without the multiplication of kindergartens, one factor in that progress would have been lacking. The work of the kindergarten associations was a work by women for women and children. It was undertaken because of their faith in the enlightenment of motherhood as a means to a better and happier childhood, and hence to a better and happier humanity.

Progress of the Movement. The adoption of the kindergarten by the school has made steady progress since the early days. Five of the large cities—Milwaukee, New Orleans, Boston, Philadelphia, and Los Angeles—and about twenty-five smaller ones, took this step during the decade from 1880 to 1890. During the next decade, Chicago, Saint Paul, New York City, Denver, Cleveland, Washington, Kansas City, Buffalo, Pittsburgh, and many smaller cities were added to the list. Progress in this direction has continued since the new century opened, the increase covering the number of cities adopting kindergartens, and the number of kindergartens opened in the cities in question. Statistics collected for 1913 showed that during the decade ending with that year, public kindergartens had doubled in New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, and Iowa. At that time, the number of cities and towns having public kindergartens was estimated at 1,100. This was a good showing for the states mentioned. There are others, however, in which the kindergarten has gained but a very slight foothold. In twelve of these, the number of children enrolled in kindergartens forms but one per cent of the number of kindergarten age. The highest percentage of children in kindergarten is found in New Jersey, where it is twenty-eight. The movement in Canada shows similar inequalities. In Ontario the kindergarten is well established. Toronto adopted the kindergarten as a part of its school system in its early years, and its example has been followed by London, Montreal, Ottawa, Hamilton, Kitchener, Peterboro, Galt, and North Bay. In the other provinces, the kindergartens are still largely private or charitable, and one finds only an occasional public institution. The reorganization of methods resulting from kindergarten influence, described elsewhere, has not been confined to the localities in which the kindergarten has been adopted. In helping to effect that reorganization, the kindergarten has rendered a lasting service to children in the United States and Canada.

Some Results of Kindergarten Training. In addition to its influence upon the methods of the grades, the kindergarten has exercised an influence upon the training of teachers. Before



Block Houses. At top farm house, barn, and silo. Center: farm yard, outbuildings, and animals (freehand cutting). Below: city street, with houses and stores.

the kindergarten came, little, if any, training had been considered necessary for the teachers of the youngest children. The contrast between the work with children by those without preparation, and that of the kindergartner trained for her task, was so great that no argument concerning the importance of training for those who were to work with little children was necessary. The result of this new standard is seen in present requirements for primary teachers, and in the nature of the training for primary work now very generally given in the normal schools.

Kindergarten training has done more than to show the necessity of training for work with little children, however; it has shown also what the nature of such training should be. Normal-school courses have emphasized subject matter—what to teach, and how. Kindergarten-training courses concentrate their attention upon the child and the needs of his progressive development. It is with the needs of children of a specific age in mind that the teacher of kindergarten discusses with her students the work to be done with children. In consequence, the work is direct and practical, and the students' application of it in their practice teaching is vital. The value of this method of work is being recognized by normal schools, and the work of the primary course is being reshaped upon that basis.

In taking the child's progressive development as the foundation of its work, the kindergarten-training school has taken a basis that gives it still another value. One of the purposes of such a study is realized when that knowledge is made the groundwork for successful work in the kindergarten. A higher purpose is realized when such a study is selected as a means to the development of womanly character in the students in training. The study of the child's development is a study of unusual interest to young women, and touches springs of action in them that the usual academic subjects fail to touch. It is because young women have felt that such study has a value for their own lives that over 30,000 have graduated from kindergarten-training schools, and that many are now taking kindergarten courses in preference to college courses.

Value of Kindergarten Training for Mothers.

It is because the kindergarten-training school makes the child's development the basis of its work that it has still another value—perhaps the greatest of all. This is its value for home-making. The kindergartner's success in dealing with children is, in fact, the strongest argument for the training of mothers. That success is often commented on by mothers who see their own children, unmanageable at home, become well behaved when they enter kindergarten. The success in question is the result of the kindergartner's knowledge of children's

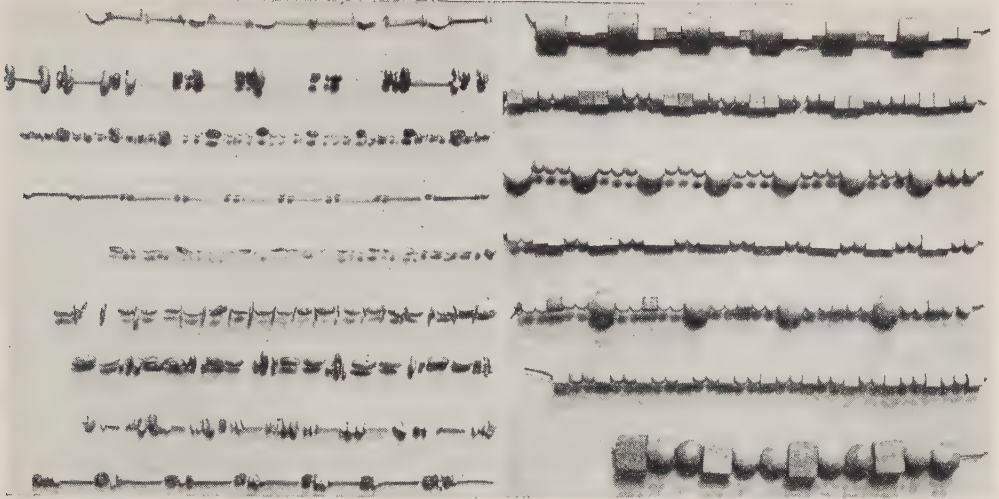
characteristics at the kindergarten age, and of what to do with them in view of these characteristics. If mothers were to make the study of children that kindergartners make, and to make a study also of the agencies for their development—their play material and the songs and stories adapted to their stage of development—they would be much better fitted than some now are to guide the children's development, and to make the home the happy place that it should be, for the mother as well as for the children, if both are to be at their best.

The women who espoused the kindergarten course in the early days felt that their work for the children was incomplete unless the mothers had also been initiated into the new educational ideals. They believed that all mothers needed the new vision, not for the happiness of the children alone, but for the inspiration it would give to their own lives. That the Froebelian conception of life contributes to a mother's happiness as well as to her efficiency is the testimony of thousands of kindergarten-trained mothers.

Women's Coöperation Still Needed. The fact that the kindergarten and kindergarten training are recognized by the highest educational authorities as working along right lines and contributing to the solution of educational problems must be apparent from this brief sketch. The coöperation of women is still needed, however, if the kindergarten is to fulfill its whole purpose. The labors of the women of the early years in its behalf will stand, but their work was but a beginning that others must carry to completion. The kindergartens enroll over half a million children, but there are more than three and a half million still without the privileges it has to offer. Two million of these live in rural districts where none but home kindergartens are possible. If these children are to know the meaning of the word, they can only know it through their mothers' efforts to master its principles and apply these in their own homes. The remaining million and a half or more live in places that are large enough to have adopted kindergartens, but have not yet done so. Do not the mothers in these communities owe it to their own children and those of their neighbors to acquaint themselves with a movement contributing so much to educational progress, and to work for its advancement?

Principles of Kindergarten Procedure and Their Application

The mother who wishes to acquaint herself with the principles of kindergarten procedure will find many books to interest her. Since these principles have their origin in the conception of education as a process of development, she will gain much of the insight needed



KINDERGARTEN ACTIVITIES

At left, necklaces made of seeds and straws. At right, ways of stringing beads of varying size and form.

by making the child's development the basis of her study. The result of such a study, thoughtfully made, will doubtless confirm certain conclusions that she has already reached from the observation of her own children; namely, that development is an unfolding from within which follows a law of its own; that the unfolding divides itself into stages or periods, each of which has its own characteristics and makes its own contribution to the process as a whole; that, if development is to be complete, the conditions for that development must be met during each period; and that, if it is to be directed, the mother must have a knowledge of the whole.

These conclusions Froebel reached nearly a hundred years ago, and it was from them that he derived the idea of education as a process of directed development. He therefore set himself the task of working out the principles and methods of an education thus founded. Realizing that upon this basis much would be required of the mother, he wrote his greatest book, *The Mother Play Book*, to aid her in seeing and meeting the child's varying needs. It was because he thought that neither the home nor school adequately met the needs of children between the ages of four and six years that he devised the kindergarten, and made it the embodiment of his new conception of education and the methods of carrying it out. That education is a process of development and that mothers must understand the process, in order to cooperate with nature to make it complete, was the burden of his message and one of the chief sources of his influence.

How Development Can Be Directed. Since the mother must cooperate with nature in the child's development, if that development is to

be complete and directed, it is essential that she should understand the nature of the cooperation that she is to give. An illustration from the physical side is in point here. That a child's food must be adapted to his digestive power at different ages no longer needs arguing. The providing of this suitable food is the kind of cooperation needed at this point. The child has other needs, also—social, intellectual, and spiritual. These must be met as they arise, in the same manner, if the conditions for his complete development are to be complied with.

But the cooperation on either plane requires knowledge. The mother can only know what food is appropriate by knowing the nature of the food adapted to him. To know what intellectual or spiritual nourishment the child needs at a particular period, she needs a corresponding knowledge of his development on these planes. The mother must, therefore, be a student of childhood and an observer of her own children. By knowing the general trend of development at a given period, she can discern his needs and meet them as they arise. The evidence of a new need is found in the awakening of new interests. When he makes an effort to walk, for example, he is ready for help in that direction. Had she tried to make him walk before he showed that readiness, she would have hindered his progress instead of furthering it. This illustrates another point in the law of cooperation—that the effort to further development in any line must be based upon a knowledge of the development already attained.

These conclusions, drawn from a study of the child's development—namely, that he has varied needs which must be met if his development is to be complete; that instruction should

be adapted to his comprehension; that help should be given in response to his interest; and that effective help can be given only on the basis of a knowledge of his capabilities—all these, recognized and applied at first in the kindergarten, are now being applied also in the home and in the school.

Their application in the school has already occasioned important changes in its procedure. In the past, the children were taught only the "three R's." The introduction of drawing, music, handwork, and games is a recognition of their more varied needs. In the past, they learned as best they could the things the teacher gave them. At present, she plans their work on the basis of the children's capabilities at a given period. In the past, children were assumed to have the same knowledge of right and wrong that adults have, and they were judged by the same standard. At present, parents and teachers recognize that the moral sense is a matter of development, and that they must be judged on the basis of the insight possible to their stage. As a result, children's interest in their school work is much more vital, and their conduct has a firmer basis than mere authority.

Direction of Development by Habit Formation. Thus far, development has been considered from the side of the child's needs alone; but there is another side that merits attention. The child has a right to an education suited to his needs, but society has a right to demand that the standards of conduct and intelligence which civilization has built up shall be a factor in his shaping—in other words, that the child shall form habits of kindness, courtesy, truthfulness, and self-control. Can this be done without violating the principle of adapting instruction to his comprehension? Yes, if the mother understands the principle of habit formation. She has chosen the food adapted to his need on the basis of the world's best judgment, and it is on the same principle that she has selected the pictures, stories, and material that met his play needs. It is through her selection of these that she has already influenced his ideals in the direction of right standards.

The formation of habits to correspond to these ideals is effected largely through the mother's approval of the arts that are in harmony with these ideals, and the ignoring or disapproval of those of the opposite character. The repetition of the art is the result of such approval, and by frequent approvals and repetitions, the habit of action is established. The mother's approval has thus become, for the child, the selective principle by which he is led to adopt the standards of civilization.

Self-Activity as a Means of Development. That the child's development is effected by means of his activity in the form of play is

another truth which the kindergarten first illustrated, and which the school has adopted. The part which the different forms of kindergarten activity play in the child's development has already been shown, and need not be repeated. The example of the kindergarten has helped to bring the value of play to the attention of educators, and has had its influence in building up the playground movement. Play is now recognized as having even greater value than Froebel attached to it—its value in building up the nervous system, the nature of which was not as clearly known in his time. It is now generally known that children are physically active during the early years because nervous energy is generated faster than it can be controlled or used; and that the activity which they could not control if they would is the means by which the nervous system is developed.

It is because play is now recognized as having a physiological function—that of developing nervous and muscular energy—that the kindergarten activities are being increasingly appreciated and that playgrounds are being generally established. It is through activity in this and other forms that children develop initiative and individuality. The help given them when they are working out their own problems is help of the most effective kind. It is in such activity that Froebel believed that children show their highest self—the self that allies them with the creative principle of the universe. The fact that schools have spent millions of dollars, in recent years, to provide facilities for cooking, sewing, basketry, manual training, and art work, shows that the public, too, is convinced of its high value.

Other Principles Which the Kindergarten Illustrates. It is because the kindergarten exemplifies so conspicuously the principle of education by development, through the medium of activity, that this aspect of its doctrine is especially associated with it in the public mind. Its whole message is not expressed in this alone, however. It is from another doctrine that a part of its influence has come—one that gives the principles named their deepest significance. This is Froebel's interpretation of humanity as spiritual in essence, and of the child's unfolding as bringing the spiritual principle within him to expression. To bring this to its fullest development in every child was, therefore, to Froebel the means of bringing into existence a higher and happier humanity. His methods were organized with such unfolding in view. This is why he insisted on freedom, at least under limitation, since without it the child's best self cannot come to expression. He would have the conduct or effort resulting from such freedom brought to the test of some standard, however—the conduct of a character in a story or the



AUTUMN LEAVES USED FOR BORDERS

effort of a playmate. If the result of that comparison were favorable, the child would win merited commendation; if not, the better effort of the other would become the incentive to improvement on the child's own part. Growth of character would be the result, because the improvement would be the result of his own will. In this way, he would become, on his own plane, a self-governing personality. This doctrine has large implications, but for these the reader is referred to Froebel himself. (See article FROEBEL, in these volumes.)

There are other phases of the kindergarten doctrines that merit discussion, but these must suffice here. It is because these principles are based upon accepted facts of the child's development that they are valid for the school and the home, as well as for the kindergarten. In consequence, their study cannot fail to give mothers a deeper insight into the training of the child and the methods of solving the problems connected with it. A wider acquaintance with these principles, as applied to the work of young children, would furnish the spur of an educated motherhood to compel the school to do its best for them. The school has never given the youngest children their just dues. The *per capita* expenditure for the children in

the high schools is twice that in the grades; and of those in the grades, the youngest do not share privileges equally with the older ones. This is one of the many conditions that a larger study of the little child's education on the part of mothers could be expected to remedy.

M.V.O'S.

Related Subjects. The following articles in these volumes contain material which will be helpful in connection with the discussion of the kindergarten:

Baby	Habit
Child	Montessori Method
Child Study	Nature Study
Doll	Play
Education	School Gardens
Froebel, Friedrich	Schools
Games and Plays	Story-Telling
Gardening	Toys

KINEMACOLOR, *kin' e mah kul ur*, a method of making moving pictures in color, and without artificial coloring materials. It was invented by Charles Urban and G. Albert Smith, and first exhibited in London in 1909. Thirty-two exposures a second are made with a rotating color filter between the lens and shutter. The color filter is a revolving wheel with two narrow blank sectors and two sectors of colored sheet gelatin, one green and one red. Exposures are made through these sectors alternately. See MOVING PICTURES.

KINEMATICS, *kin e mat'iks*, the branch of mechanics that deals with pure motion apart from all causes. To the idea of space and the movement of a point in space, employed in geometry, kinematics adds the idea of time; that is, displacement at a definite speed in a definite direction. The mass of the moving body and the forces that set it moving do not enter into consideration. See FALLING BODIES; MECHANICS; FORCE.

A.L.F.

KINETIC, *kin et' ik*, **ENERGY**. See ENERGY; MOMENTUM; VELOCITY.

KINETOGRAPH, *kin et' ograf*, and **KINETOSCOPE**, *kin et' o skope*, the names originally given by their inventor, Thomas A. Edison, to the machines used, respectively, for taking and for exhibiting moving pictures. They are now commonly called the *camera* and the *projector*. See MOVING PICTURES.

KING, a reigning sovereign who holds his position by life tenure and hereditary succession. The world has woven much of romance around the name and office of king. In medieval days, the king was acknowledged the earthly representative of God, and "the king can do no wrong" was commonly accepted and believed. The word is a figure of speech for splendor, vast power, and regal authority, but the modern king is often a constitutional monarch, whose privileges and duties are as sharply defined as is the conduct of his subjects. This statement is true of Great Britain, for example. In Afghanistan, on the other hand, the king has almost absolute power.

Related Subjects. The reader is referred in these volumes to the following articles:

Emperor	Queen	Rulers of the World
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KING, BASIL. See CANADIAN LITERATURE (English Canada).

KING, BEN. See PARODY.

KING, CLARENCE (1842-1901), an American geologist whose surveys and investigations in the West resulted in valuable additions to the science of geology. In this work he aided materially in the development of the mining industry in the United States. After his graduation from the Sheffield Scientific School at Yale, he spent several years in the exploration of California, making the first survey of the Yosemite Valley and discovering and naming mounts Whitney and Tyndall. Placed in charge of the United States geological exploration of the fortieth parallel, in 1867, he gave five years to this work and thereby laid the foundations for future geological investigations for the government. When, in 1879, the geological surveys acting under the government were organized under one head, King was made first director of the department.

[Among his writings are *The Age of the Earth* and *Systematic Geology*.]

KING, WILLIAM (1768-1852), first governor of the state of Maine and an influential factor in its early political history. He is a representative of that state in Statuary Hall, Washington, D. C., the statue having been presented in 1878. Born at Scarborough, Me., he moved to Bath in 1800. Here he organized and was president of its first bank. His most important public service was the part he took in the struggle for the separation of the district of Maine from Massachusetts, and he later presided over the convention that framed the constitution for the new state. In 1820 King was elected its first governor, and at the expiration of his term, was appointed adjuster of Spanish claims in Florida. See STATUARY HALL.

KING, WILLIAM LYON MACKENZIE (1874-), a Canadian economist and statesman, a grandson of William Lyon Mackenzie. He is noted for his studies and investigations in problems of labor, and for his skill in the set-



Photo: British & Colonial Press

WILLIAM LYON MACKENZIE KING

tlement of industrial disputes. King was born at Berlin (now Kitchener), Ont., and was graduated from the University of Toronto in 1895. Between that year and 1900, he was in turn a newspaper writer, a student at the University of Chicago, a special Dominion commissioner to investigate the carrying out of

government clothing contracts in Europe, and an instructor at Harvard University, where he also pursued advanced studies for which he was given the degree of Doctor of Philosophy.

In 1900 King was appointed Dominion Deputy Minister of Labor and editor of the *Labor Gazette*, and in the next few years was repeatedly called on to act as conciliator in industrial strikes. In 1908 he was elected as a Liberal to the House of Commons, and a year later, when the Ministry of Labor became a separate department, was appointed its first Minister. He held this position until 1911, when he resigned with the Laurier government and was defeated for reelection to the Commons. In 1914 the Rockefeller Foundation (which see) appointed him to conduct extensive researches into the relations between capital and labor.

In 1921 King became Prime Minister and the head of the government. In 1926 his government retired, but was returned to power almost at once when the short-lived Cabinet of Meighen failed to function. See CANADA (History: Rise of Premier King).

KING, WILLIAM RUFUS (1786-1853), an American statesman and thirteenth Vice-President of the United States. He was born in Sampson County, N. C., and was educated at the state university; later, he studied law, and in 1806 was admitted to practice. The same year he was elected to the state legislature, and in 1810 to the national House of Representatives. In 1816 he became secretary of the United States legation in Naples, and afterward went to Russia in the same capacity.

After his return from Europe, in 1818, King settled in Dallas County, Ala., as a cotton-planter, and was a member of the convention which framed the state constitution. In 1844 he was appointed minister to France. England was then opposing the proposed annexation of Texas, and thought France would join in the protest, but the American minister secured Louis Philippe's promise not

to offer objection, and Texas was accordingly annexed without further opposition. King was elected Vice-President of the United States in 1852, on the Democratic ticket with Franklin Pierce (which see).

KING ARTHUR. See ARTHUR, KING.

KINGBIRD, an interesting, drab-colored bird of the flycatcher family, of great assistance to the agriculturist. It has a slate-gray back, white under parts, and a patch of bright-red feathers on the top of its head, which it raises as a crest when angry, but otherwise conceals. It is less than nine inches long. The kingbird derives its name from the despotic authority it assumes at certain seasons over other birds, for it attacks them furiously as they fly and forces them to divert their course. However, only in the breeding season does the kingbird act so rudely, and love for its mate and its young prompts such deportment. The nest, made of grass and weeds, is frequently placed in fruit trees. In it are laid three to five eggs, which are pinkish, spotted with brown.

This bird has keen sight and is ever on a sharp lookout for insects, which it catches mostly

while it is on the wing. Because of its fondness for bees, it is also called *bee martin*. Since, however, it eats few hive bees, it is very beneficial to agriculture. The kingbird is found in all parts of the United States, except the Southwest, and is also a resident of Southern Canada. In winter it migrates to Central and South America.

D.L.

Scientific Name. Kingbirds belong to the family *Tyrannidae*. The common kingbird, described above, is *Tyrannus tyrannus*.

KING CHARLES SOUTH LAND. See TIERRA DEL FUEGO.

KING CRAB, a large marine animal which frequents the shores of bays and estuaries on the eastern coast of North America southward from Maine to Mexico. The king crab is not a true crab, but belongs to a group more closely related to the scorpions. The creature has a segmented shell-covered body consisting of a large hoof-shaped head and thorax, and a smaller abdomen, or hind body, from the end of which a long, sharp spine projects. This is a weapon of defense. Including the spine, the body is sometimes nearly two feet long. On the upper surface of the head are borne a pair of large compound eyes and two very small simple eyes; on the lower surface is a centrally located mouth, about which are



THE KINGBIRD

The bird, its nest, and its bill of fare.



Photo: Brown Bros.

RUFUS KING



Photos: Visual Education Service

BELTED KINGFISHER (LEFT); EUROPEAN (RIGHT)

six pairs of legs. These terminate in spines which are used for grasping food and prey. The abdomen bears six pairs of swimming organs. On the first pair the egg ducts open by pores, and the others bear numerous flat, leaflike gills. The king crab lives on worms and shellfish, which it seizes as it burrows its way through soft mud or sand. It is used as fertilizer, swine and poultry food, and as bait. For other details, see HORSESHOE CRAB. S.H.S.

Classification. Most zoölogists regard the king crab as a member of the subclass *Merostomata*, class *Arachnida*, subkingdom *Arthropoda*. The scientific name is *Limulus* (or *Xiphosurus*) *polyphemus*. The king crab and four related Asiatic species are the only surviving members of a large group existing in prehistoric times.

KING EDWARD VII LAND. See ANT-ARCTIC LANDS AND SEAS.

KINGFISHER, the name of a family of birds whose distinguishing characteristics are large heads and backward-turning crests; long, pointed bills; short, stubby tails; and short legs. Strong membranes unite the outer and middle toes. Their brilliant colors and fish-eating habits suggested the name.

In the large kingfisher family there are two subfamilies, the *kinghunters* and the true *kingfishers*. Birds of the first group are found in Europe, Africa, and Asia. In appearance they are much like true kingfishers, but differ in habits. They live in woods, often very far from streams, and eat insects and reptiles rather than fish. The second group includes the brilliant little European kingfisher and six American species. Kingfishers are found throughout North America. In the summer time, they range from the Arctic Ocean to the Gulf of Mexico and from the Atlantic to the Pacific. In winter they migrate south of the frost belt.

The best-known and most widely distributed American species, the *belted kingfisher*, is twelve or thirteen inches from the tip of the bill to the end of the tail. The color above is deep blue, or bluish-gray marked with white; the under parts are white. A broad collar of blue crosses the breast, and the female has, in addition, lines of chestnut-brown which extend along the sides. Anglers may depend upon these birds to know where the fish are plentiful. They spend long hours sitting upon branches which extend over a stream, and dashing into the water after small fish that pass their way. They carry the fish back to their branch, knock it soundly to kill it, then toss it into the air, catching it as it comes down. If the kingfishers are disturbed, they fly off, piercing the air with their harsh, rattling notes.

Kingfishers dig their nests in the perpendicular walls of clay or sand banks. The opening is just large enough for one bird. The tunnel is from four to ten feet in length, and is enlarged at the farther end, where is made a nest for the six or eight pure-white eggs. Both male and female sit on the eggs, and the little birds hatch in about sixteen days. D.L.

[The kingfisher has been identified with the halcyon of ancient fable, which was said to lay its eggs in a nest that floated out to sea. See HALCYON.]

Scientific Name. Kingfishers constitute the family *Alcedinidae*. The belted kingfisher is classed as *Ceryle alcyon*.

KING GEORGE'S WAR. See FRENCH AND INDIAN WARS.

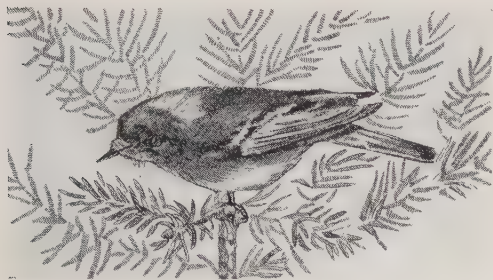
KINGHEAD. See RAGWEED.

KING JAMES VERSION. See BIBLE (The Accepted English Versions).

KING JOHN. See SHAKESPEARE, WILLIAM (Synopsis of the Plays).

KING LEAR. See SHAKESPEARE, WILLIAM (Synopsis of the Plays).

KINGLET, the name for certain dainty little olive-green birds that flit about rapidly among the leaves and twigs in search of insects. Two species, the *ruby-crowned* and the *golden-crowned*, are found in North America, many



THE KINGLET

of the golden-crowned being so rugged that they never fly south during the winter in search of a warm climate. Both birds have gray breasts and short, dusky tails, edged in olive-green like their backs, but their distinguishing feature is their bright crest, the color of which is indicated by their name.

The ruby-crowned kinglet is fond of warm weather, so in October it flies to the Southern United States, Central America, and Mexico, but returns in the spring to the Northern United States and Canada, filling the air, while on the way, with a rich, lyrical song. Both birds frequent the pine trees, building their hanging, cup-shaped nests of moss, grass, and feathers near the tip ends of branches. These nests may seem large for such small birds, for they are only about four inches in length, but from six to ten creamy-white eggs, with small brown dots, are laid in this cradle, and there must be room for the baby birds. The kinglets are beneficial because they feed on insects and their eggs.

D.L.

Scientific Names. The kinglets belong to the family *Sylviidae*. The golden-crowned is *Regulus satrapa*; the ruby-crowned is *R. calendula*.

KING-MAKER, a title commonly given the Earl of Warwick (which see).

KING PHILIP (? -1676), a famous Indian chief connected with early American history, whose real name was *Metacomet*. He was the son of Massasoit, friend of the white colonists and ruler of the Wampanoags, a tribe living in what is now Southeastern Rhode Island.

Philip is famous as the chief character in the most severe Indian war in which the English colonists were ever engaged. Like his father, Philip had long been friendly to the whites, but, believing that their occupancy of the country would result in the destruction of his own people, he joined with the latter when they rose against the colonists. This outbreak, known as King Philip's War, was marked by massacres and widespread destruction. The superior forces of the English gradually weakened the power of the Indians, who were finally entirely subdued. Philip fled to his old home near Mount Hope, R. I., where on August 12, 1676, he was hunted down and killed by a searching party.

KINGS, BOOKS OF, two books of the Old Testament, in which is related the political history of the kingdoms of Israel and Judah from the close of David's reign to the fall of Jerusalem and the Captivity in Babylon. The stories of the two kingdoms were closely interwoven up to the capture of Israel, for both countries had a constant conflict within themselves over the worship of God and Baal. However, Judah was led by the faithful kings Asa, Hezekiah, and Josiah, so it existed for 130 years after the fall of its neighbor. Although the authorship of the books is uncertain, they cover about the same period of 400 years described in *Chronicles*, and were probably written by the prophets or priests, being later collected into the one Hebrew book by Jeremiah or Ezra, and into two books by the translators. See *CHRONICLES, BOOKS OF*.

KING'S BENCH. See *COURTS* (Courts in Great Britain).

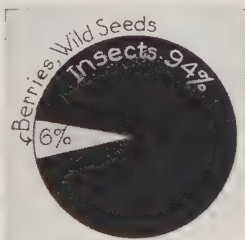
KINGS BOROUGH. See *NEW YORK CITY*.

KING'S COLLEGE, the original Columbia University (which see).

KING'S COUNSEL. See *BARRISTER*.

KING'S EVIL, an old name given in England to scrofula (which see).

KINGSFORD, WILLIAM (1819-1898), a Canadian engineer and historian, whose *History of Canada* is still a standard work. In the preparation of this great work, in ten volumes, he spent seventeen years in a faithful study of the Canadian archives, and then devoted the last ten years of his life to writing it. It is an accurate, straightforward account of the story of Canada. Until the appearance of this monumental history, Kingsford was known as an engineer and author of books on Canadian canals and railroads. He was of English birth, but went to Canada in 1837 as a soldier. In 1841 he left the army to go into the city surveyor's office in Montreal. Thereafter he was employed in the survey of the Lachine Canal, in the construction of railways in New York State and Panama, in the survey of the Grand Trunk Railway, and finally, from 1872 to 1879, was Dominion engineer in charge of the Saint



FOOD OF THE KINGLET

Lawrence River and the harbors on the Great Lakes. See CANADIAN LITERATURE (History and Biography).

G.H.L.

KINGSLEY, CHARLES (1819-1875), an English novelist and clergyman, who was versatile as a writer and eloquent as a preacher, winning fame in both fields.

He was born in Devonshire, educated at Magdalen College, Cambridge University, and after his graduation, in 1842, became a curate of the parish of Ever-sley, in Hampshire. Two years later he became its rector. He soon began to devote himself to the welfare of the working classes, revealing his genuine sympathy for the poor in his first novel, *Alton Locke* (1849), the hero of which is a London tailor. In *Yeast, a Problem*, which soon followed, he pointed out the conditions of the English farm laborers. Kingsley was appointed professor of modern history at Cambridge in 1860; in 1869 he was made canon of Chester, and later became canon of Westminster. He was one of the most effective preachers of the day, and his best pulpit discourses have been published under the title *Twenty-five Village Sermons*. In 1874 he visited the United States, delivering a course of lectures while there.

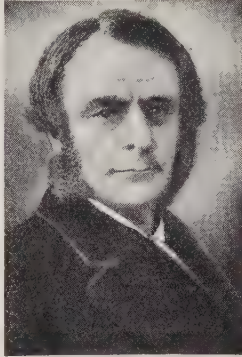


Photo: Brown Bros.

CHARLES KINGSLEY

Other Writings. As a novelist Kingsley is best known as the author of *Westward Ho!*—a stirring, vivid tale of English naval and commercial glory in the days of Queen Elizabeth. Of almost equal dramatic interest are two other historical novels, *Here-ward the Wake*, the events of which take place during the reign of William the Conqueror, and *Hypatia*, the story of Christianity in conflict with the declining philosophy of Greece in the fifth century. He was also the author of several poems and of a charming fairy tale for children, entitled *The Water Babies*.

KING'S MOUNTAIN, BATTLE OF. See REVOLUTIONARY WAR.

KINGSTON, a seaport in Jamaica (which see).

KINGSTON, N. Y. See NEW YORK (back of map).

KINGSTON, ONT., the county town of Frontenac County, is situated at the eastern end of Lake Ontario, where waters of the Great Lakes enter the Saint Lawrence River. It is also at the mouth of the Cataraqui River, and is the southern terminus of the Rideau Canal. Population, 1921, 21,753.

Transportation. The position of Kingston at the entrance to the Saint Lawrence makes it a port of

call for all steamers on this route. The harbor is large, and is sheltered by Wolfe and Simcoe islands. Kingston is served by the Canadian Pacific and the Canadian National railroads.

Industry. Kingston's industries include boat-building and the manufacture of locomotives and railway rolling stock, cotton and woolen goods, leather, pianos, and tiles.

Education. Chief among the educational institutions is Queen's University. Here, too, are the Royal Military College of Canada, founded in 1886, the School of Mining, and the Eastern Dairy School.

KING'S TOUCH. See SUPERSTITION (Driving Evil Spirits); SCROFULA.

KINGSTOWN, capital of Saint Vincent (which see).

KING WILLIAM'S WAR. See FRENCH AND INDIAN WARS.

KINNICKINNIC, *kin ih kih nik'*, RIVER. See MILWAUKEE, WIS.

KINO, FATHER. See ARIZONA (History).

KINZIE, JOHN. See CHICAGO (History).

KIOSK, *ke usk'*. See PAGODA.

KIOTO, OR KYOTO, *kyo' toh*. See JAPAN (The Cities).

KIOWA, *ke' o wah*. See INDIANS, AMERICAN (Most Important Tribes).

KIPLING, [JOSEPH] RUDYARD (1865-), an English short-story writer, novelist, and poet. Few writers have excelled him in versatility and creative imagination. His characters seem so real that some of them, like Mulvaney in the soldier stories, will be long remembered. All of his work is characterized by vigor, directness, and simplicity. With these qualities he combined a high degree of literary skill. Critics agree that he was the master balladist and master short-story writer of his time.

Kipling was born on December 30, 1865, in Bombay, India, the country which he has pictured in all its variety, its mystery, and its strange beauty. His father, who was for several years connected with the art schools at Bombay and Lahore, sent him to England when he was five years of age. In 1879 Rudyard entered the United Services College at Westward Ho, Devonshire, enjoying there a series of school-boy adventures which he afterward reproduced in the breezy stories published under the name *Stalky & Co.* (1899). At the age of seventeen, he returned to India and joined the editorial staff of the *Lahore Civil and Military Gazette*. In this journal appeared some of his earliest verse and sketches of Anglo-Indian life. From 1887 to 1889 he was assistant editor of the *Allahabad Pioneer*, and during this period published several of his best-known narratives, including *Soldiers Three*, *The Phantom Rickshaw* and *Other Tales*, and *Wee Willie Winkie* and *Other Child Stories*.

In 1892 Kipling married the daughter of H. Wolcott Balestier of New York, and for a few years thereafter made his home in Brattleboro, Vt. His fame as a writer of fiction was already

secure, but he won new laurels through his spirited verses in the quaint language of the soldier, published in 1892 in book form under the title *Barrack Room Ballads*. Two *Jungle Books*, those fascinating beast stories whose scenes are laid in the wilds of India, appeared in 1894 and 1895 to delight a host of readers, old and

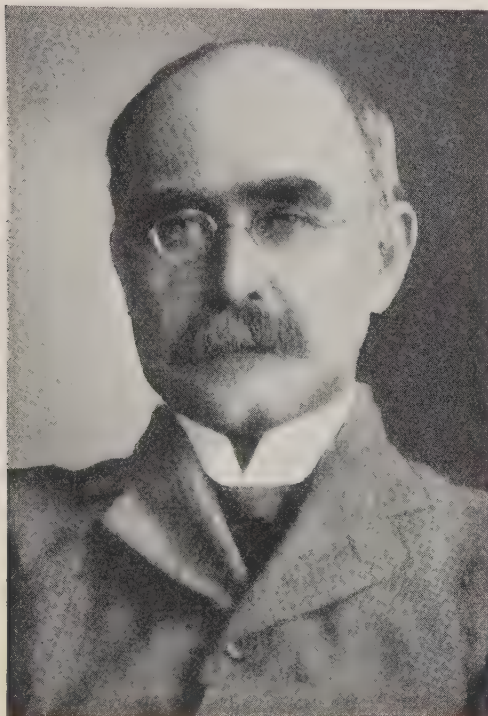


Photo. Brown Bros.

RUDYARD KIPLING

young. Two years later, Kipling wrote his noblest poem, *The Recessional*, in honor of Queen Victoria's diamond jubilee. The opening stanzas of this majestic song could appropriately be called a prayer for all nations:

God of our fathers, known of old—
Lord of our far-flung battle-line—
Beneath whose awful Hand we hold
Dominion over palm and pine—
Lord God of Hosts, be with us yet,
Lest we forget, lest we forget!

The tumult and the shouting dies—
The captains and the kings depart—
Still stands Thine ancient sacrifice,
An humble and a contrite heart.
Lord God of Hosts, be with us yet,
Lest we forget, lest we forget!

Other Books. The most notable of Kipling's longer narratives, *Kim*, appeared in 1901. This marvelous panorama of life in India was followed the next year by *The Just-So Stories*, a book for children. In 1907 the author visited the Canadian Northwest, where he received a most enthusiastic welcome, and the same year he was awarded the Nobel prize for

literature (see NOBEL PRIZES). Among his later writings are *Traffics and Discoveries*, *Puck of Pook's Hill*, *Actions and Reactions*, *Rewards and Fairies*, *A History of England* (written with C. R. Fletcher), *The Harbour Watch* (a play), *Letters of Travel*, *The Irish Guards*, *Land and Sea Tales*, and *Debts and Credits*. During the World War, he wrote much on that conflict. In 1923, in succession to James M. Barrie, Kipling was honored by being chosen rector of Saint Andrews University. His *Book of Words*, published in 1928, was described as "the nearest thing to a Kipling autobiography."

KIPPERED HERRING. See HERRING.

KIRBY, WILLIAM. See CANADIAN LITERATURE (English Canada: Fiction).

KIRGHIZ, *kir geez'*, a group of wandering tribes, ethnologically a division of the Turks, who inhabit the plains and marshes between the borders of European Russia and those of Western China, northward beyond the Syr-Darya River. The Kirghiz are now united to Communist Russia. They possess Mongolian features and employ Tartar speech, live in tents, keep cattle, horses, camels, goats, and fat-tailed sheep, and raise wheat, barley, and millet. Manufacturing among them is limited to handwork in metals and the weaving of wools, and trade is carried on by barter. Their number is estimated to be 3,000,000. See TURKS. c.w.

KIRK-KILISSE, *keerke ke le sa'*, BATTLE OF. See BALKAN WARS.

KIRKWALL, capital of the Orkney Islands (which see).

KIRKWOOD, SAMUEL JORDAN (1813-1894), Secretary of the Interior in the Cabinet of President Garfield, honored by the state of Iowa as one of its two representatives in Statuary Hall, Washington, D. C. (1913). He was born in Harford County, Md. For a time he taught school at Mansfield, O., while studying law, and was admitted to the bar in 1843. Later, he moved to Coralville, Ia. Before the expiration of his second term as governor of Iowa, Kirkwood resigned to become Senator. In this capacity he served from 1877 to 1881, when he accepted the portfolio of Secretary of the Interior in the Garfield administration. Upon the death of Garfield, he gave up the Cabinet position to resume law practice. At the time of his death, he was president of the Iowa City National Bank. See STATUARY HALL.

KISH, an ancient city of Babylonia. See DELUGE (The Biblical Story Verified).

KISHINEV, *ke she nyef'*. See RUMANIA (Principal Cities).

KISMAYU, *kis mah' yoo*, chief port of Italian Somaliland. See SOMALILAND (Italian Somaliland).

KISOGAWA RIVER. See JAPAN (Waters).

KISS. This common form of greeting is of very ancient origin. The *osculum* was a formal symbol of good will among the Romans, and

was adopted by the early Christians. The "holy kiss" and the "kiss of charity" were given the weight of apostolic sanction. The "kiss of peace" is given to-day in the Eastern and Roman churches at the mass. Newly created cardinals, and royal persons in former times, kissed the golden cross on the Pope's right foot, as a form of homage to the Vicar of Christ. Many references to kissing may be found in the Bible, but among the ancient Hebrews, kissing between the sexes was unknown. The kiss of greeting given in Europe by one man to another, first on one cheek and then on the other, is unknown in America, men seldom exchanging kisses. The custom of kissing a woman's hand, still common in Europe, has not been prevalent in America since colonial days.

KESSIMMEE, *kis im' ee*, **RIVER**. See **FLORIDA** (Waterways).

KIT CARSON. See **CARSON**, **CHRISTOPHER**.

KIT-KAT CLUB. See **CLUB**.

KITCHEN CABINET, a nickname in American political history. It was applied to a group of men who, during the Presidency of Andrew Jackson, although they held no important government offices, exercised a greater influence over the policy of the administration than did the members of the Cabinet themselves. The most influential of these unofficial advisers were Major William B. Lewis, second auditor of the treasury; Isaac Hill, editor of the *New Hampshire Patriot*; Amos Kendall, fourth auditor of the treasury; Duff Green, editor of the *United States Telegraph* (Washington, D. C.), and Francis P. Blair, editor of the *Washington Globe*. See **JACKSON**, **ANDREW**.

KITCHENER, **HORATIO HERBERT**, Earl Kitchener of Khartum (1850-1916), familiarly known as "Kitchener of Khartum." The extraordinary military genius of Great Britain's War Secretary is nowhere better shown than in his sure insight into the course and outcome of the World War. Two or three examples will make this clear. At the beginning of the struggle, it was generally believed that the conflict would necessarily be of short duration. Military operations were on a gigantic scale; in a single battle more ammunition was fired than in the whole South African War. Yet, from the first, Kitchener planned for an army which would

not reach its maximum strength for three years. His critics said that the war would be over in a twelvemonth.

Another instance of his instinct for forecasting events was in regard to the part which Russia would play in the war. In 1915 he remarked to Joffre, "You are calculating on Russia remaining till the end of the war; I am making my calculations on her being out within six months." The abdication of the Czar in March, 1917, and the peace made with Germany in December of that year testified to the soundness of his view.

Another of his sayings seems almost uncanny in its foresight. In the opening days of the war, when German troops were everywhere victorious, he said, "I have no fear about winning the war; I fear very much we may not make a good peace." It was a loss to the world that he did not live to participate in the Versailles negotiations. He would have aided in defining a "good peace" and in providing for it.

Kitchener was born June 24, 1850, at Ballylongford, County Kerry, Ireland, where his father, Lieutenant Colonel Henry Horatio Kitchener, was on military duty; his mother was Anne Frances Chevallier, daughter of an English preacher. His education was secured at the Royal Military Academy at Woolwich, and at the age of twenty-one he began a career which grew in brilliance with the passing years. The activities of the man may thus be summarized:

He was appointed a lieutenant in the engineer corps, 1871, and reached a lieutenant-generalship in 1902, through the following service: appointment on a survey in Palestine, 1874-1878; on a survey in Cyprus, 1878-1882; in command of cavalry in Egypt, 1882-1884; on the Nile expedition, 1884-1885; governor of Suakim, 1886-1888; with expedition on Sudan frontier, 1889; adjutant general Egyptian army, 1888-1892; commanded Dongola expedition, 1896, then reaching the grade of major general; commanded the Khartum expedition, 1898; chief of staff of forces in South Africa, 1899-1900; commander in chief in South Africa, 1900-1902, with rank of lieutenant general; commander in chief in India, 1902-1909; member of committee of imperial defense, 1910; Secretary of State for War, 1914.

After his brilliant work in the Khartum expedition, he was raised to the peerage as Baron Kitchener, and given a grant of \$150,000 and service medals. At the conclusion of the South African War, where he had seen his country safely through a campaign badly begun, Parliament gave him the nation's thanks and a grant of \$250,000; in 1914 he was created Earl Kitchener of Khartum and Broome.

Upon the entrance of Great Britain into the World War, in 1914, Kitchener was universally acclaimed as Britain's main reliance in the heavy task of raising an army. He was placed in the Cabinet with the rank of Secretary of

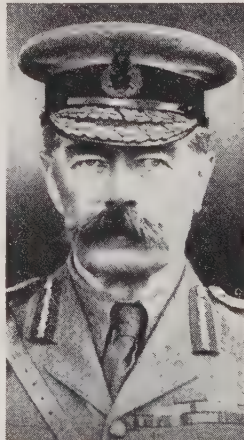


Photo: Brown Bros.
LORD KITCHENER

State for War, and was given dictatorial powers. Within ninety days there were under arms 1,300,000 men, and as many more were asked for before the end of 1914. "Kitchener's army," it was called, and it took its place on the firing lines in France as fast as its units could be prepared. By the early spring of 1916, over 4,000,000 men, gathered from all parts of the British Empire, had answered the call to arms.

On June 5, 1916, when Earl Kitchener and his staff were *en route* to Russia on business connected with the war, their vessel was sunk either by a mine or by a torpedo, not far from the Orkney Islands. Nothing was ever heard of the Earl thereafter; he and nearly all of his staff were drowned. Some reports later disproved, claimed that a German submarine had rescued him and that he was held secretly a prisoner in Germany.

He was a silent, forceful man, a deep thinker, and a strict disciplinarian. His critics termed him cold and heartless. Trained in the stern business of war and having learned the necessity of implicit obedience, he exacted rigid formalities from subordinates with a bluntness which sometimes seemed unnecessarily severe. But he accomplished well those tasks entrusted to his charge, and died while English public sentiment in his favor was at high tide. See WORLD WAR.

E.D.F.

KITCHEN MIDDENS, mounds of shells and refuse, found in many parts of the world, which represent the refuse of camps or villages once inhabited by ancient peoples. The first of these mounds to be discovered were located in Denmark, and from the Danish name given them, we derive the term *kitchen middens*. Such mounds contain large quantities of stone and bone tools, shells of shellfish used for food, fragments of pottery, and the bones of wild animals and of dogs. Kitchen middens are found all along the Atlantic coast of North America, from the Gulf of Saint Lawrence to Florida, and along the Pacific coast to the

Aleutian Islands. The objects found in these mounds give a good idea of the habits and customs of the peoples who lived in prehistoric times.

C.W.

KITE. This device of paper and light framework is called *kite* in English because it soars in the air like the bird of that name. It has been known since the earliest times, and is still one of the chief toys of children in Asia. Although the word usually calls to mind the toy which boys use, it has had many different uses; in ancient times it was associated with religious beliefs, and in modern times is employed as an aid to scientific research. The paragraphs immediately below will give some interesting information as to how kites have been of value to scientific men.

The Useful Kite. Perhaps the most famous kite employed for a scientific purpose was that of Benjamin Franklin, but he was not the first thus to use it. Three years earlier, Alexander Wilson, an astronomer of Edinburgh, fastened thermometers to kites and sent them far aloft, to record the temperature of the clouds. Then, in 1752, came Franklin, who

Brought electricity out of the sky
With a kite and a string and a key;

and since his time, more and more use has been made of the kite in science. Instruments to measure wind velocities and thermometers innumerable have been sent up, and in 1898 the United States established daily kite ascensions in seventeen weather bureaus. Ascensions to heights of almost five miles have been made, and much has been learned in this way as to the conditions of the upper air.

The engineer, too, has often found the kite of value in carrying a cable across a chasm. This was the method employed in the beginning of the construction of the great suspension bridge at Niagara Falls. In advertising, too, kites have played a part; frequently, over crowded streets or a large outdoor assemblage, they are to be seen floating, with banners hanging from them bearing political or advertising notices.

For military purposes, kites have been used for signaling, and by the addition of lights have been made to do duty by night as well as by day. A special kite balloon, too, has been invented, which is strong enough to hold a passenger car at a height of several hundred yards above the earth, and which has an advantage over the spherical balloon, in that the wind does not force it downward.

How to Make a Kite

A kite is one of the first things that the average boy wants to make, and in its simpler forms it is easy to construct. The commonest form is made of two sticks of different lengths, placed in the shape of a cross, with the shorter



Photo: O R O C

KITCHENER MEMORIAL

In the grounds of the Horse Guards, London. The statue was unveiled in 1926, the Prince of Wales officiating.

one above the center of the long one. From arm to arm, all around this framework, is stretched a stout string, and over the whole is pasted a lightweight paper—newspaper will

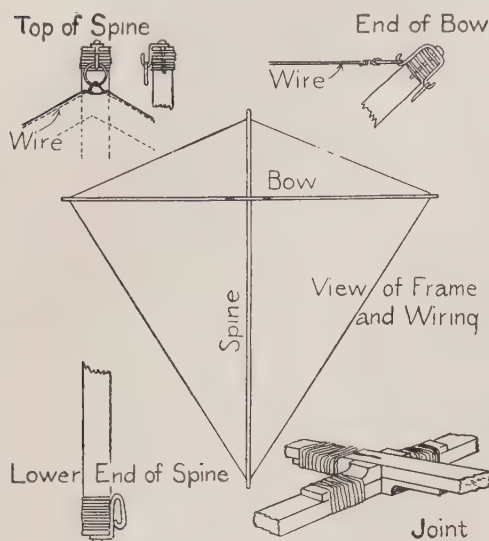
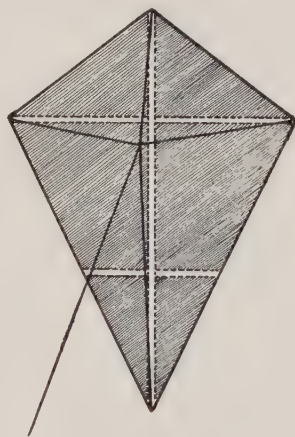


DIAGRAM OF KITE FRAME

If a kite is constructed according to this plan, it will be strong and durable.

do, but a stout tissue paper is more attractive. Strings, rather slack, follow the line of the framework, and where these cross is fastened a long string by which the kite is held when it floats far aloft. To the very bottommost point is fastened a "tail" of rags or bits of paper, for the kite needs this weight to "steady" it and keep it from "diving." The length of the tail, from six to twelve feet, is determined by the weight of the kite and the wind velocity. Here is shown a picture of the simplest of all kites, but it will be noticed that a variation is introduced. A third stick, shorter than either of the others, has been added; any boy can easily show that this will improve not only the wearing qualities but the flying power of his kite.

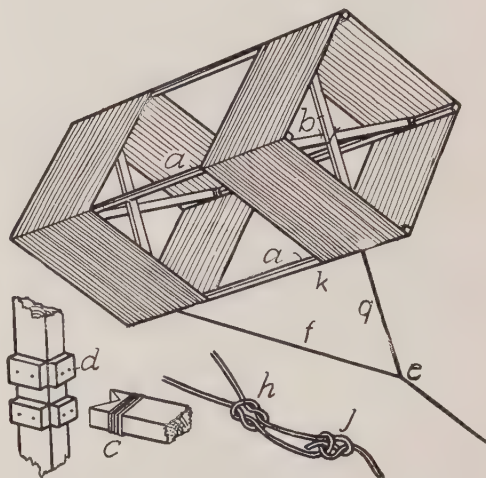


COMMON KITE

Framework and cover; tail not yet attached.

A Box Kite. The ingenious boy is not going to be satisfied long with anything so simple as a common kite, especially if he has seen some playmate flying a box kite. This form is not at all difficult to make if the directions and the design as shown are carefully observed:

Choose four sticks of straight-grained wood, such as white pine, spruce, or basswood, having them about forty-two inches long and three-eighths inch square. Fasten them together, as shown in the illustration, by means of four



A BOX KITE

(a) Frame, with (b) crosspiece; (c, d) details of joints; (e) string joined to bridle; (f, g) bridle; (h, i) knots.

braces twenty-six inches long and one-half inch by one-quarter inch in cross-section. The joining should be by means of notching, as shown in the illustration, and the joints should be thoroughly wrapped with thread or with fine wire, to prevent slipping.

Next take two bands of cambric, or some such firm, light-weight cloth, twelve inches wide and seventy-four inches long, and fasten them about the long sticks with small tacks. If the bands are hemmed on their long edges, the kite will be stronger. Be sure, in putting on the cloth, that it is drawn so tight that the diagonal braces are curved very slightly, for only so can the cloth be held firm and taut. Next attach the bridle, or guiding ropes, as shown in the design, and the kite is ready for flying. If, however, there is a very high wind, it is safer not to use a bridle, but to fasten the string to the center of one of the long sticks.

The Butterfly Kite. This is an especially pretty kite, and a fairly easy one to make. Take two long, thin sticks of equal length and bend each into an arc, as shown in the illustration. To one end of each stick tie a

strong string, fastening the other end of the string to a point about three inches from the other end of the stick. Now tie a string to



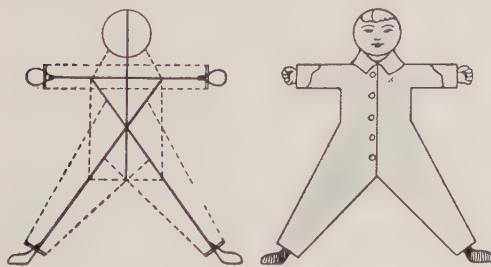
BUTTERFLY KITE

Framework and covering only are shown.

the free end of each stick, and attach the other end of the string to a point three inches from the opposite arc. Place one stick over the other, to make sure that they are just the same shape, and that the strings cross and are tied at just the same points. With strong thread fasten the sticks together in the position shown in the illustration, taking care that they overlap somewhat. The "feelers," without which it would not seem like a real butterfly, may be made of two pieces of wire or straw, fastened to the sticks not far from their intersection, and crossed. The kite is now ready for the paper, and the brighter the latter is in color, the better. Yellow makes a particularly pretty butterfly. Lay the frame on the paper and cut around it, allowing at least a half-inch margin to be turned over for pasting. It will be necessary to cut this margin edge into slits in pasting around angles and the curved edge.

Give your butterfly a tail like an ordinary kite, and, if you have an eye for color, mark it with spots and streaks of paint or use gayly colored paper or cloth.

The Boy Kite. The most interesting form of kite is most assuredly the boy kite, and the



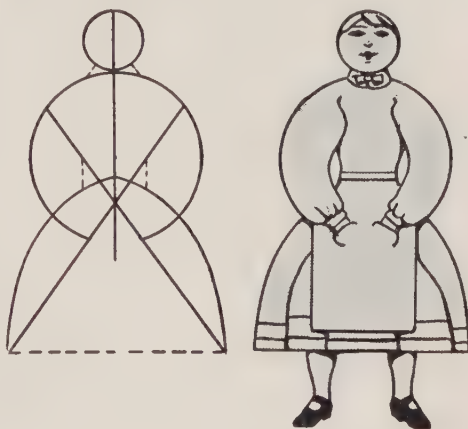
THE BOY KITE

Framework and covering are shown.

boy who has the patience and ingenuity to make one for himself is sure to be the envy of his companions. As the sketch will show, the finished product could be mistaken for nothing else than what it claims to be. Two straight sticks about three and one-half feet long are chosen for the legs and body; one, two feet four inches, for the spine; and one,

three feet three inches, for the extended arms. From a light, flexible stick or a piece of rattan, a circle seven inches in diameter is formed for the head, and this is fastened to one end of the spine. Three inches below the circle is tacked the arm stick, with an equal stretch on each side, and to this, six inches from the spine, are fastened the leg sticks. These are crossed so that they are about three feet apart at the "foot" end, and are carefully wrapped where they meet the spine. Little crosspieces should next be fastened to the ends of the arm and leg sticks, and if the maker cares to take so much trouble, he may fashion roughly hands and feet of the same material as the head.

The frame is then ready, and strings are stretched around it as indicated by the dotted lines in the illustration. Next, lay this frame-



GIRL KITE

Framework and covering are shown.

work on a large sheet of paper and cut around it, allowing a margin of a half-inch or more for pasting. In making the curve of the head it will be necessary to slit the edge of the paper to keep it from wrinkling. A bridle of string must be formed, following the lines of the leg sticks; to this the long string for flying may be attached about where the leg sticks cross the spine.

Kites of Other Lands. Fond as the American boy is of his kite, it does not mean as much to him as it does to the boys of China and Japan, where the kite has been a favorite toy for centuries. In these Oriental countries, it is not only the children but the adults who make and fly kites, and very elaborate are some of the forms. There are birds and butterflies, fish and dragons, and some of them are made of the thinnest, glossiest silk. The Chinese boy sometimes has three or four kites attached to one string, and becomes quite an adept at keeping them untangled. For kite battles, the Chinese boy makes for himself

a simple, perfectly square kite of tough tissue paper and two bamboo strips, and with this he attempts to entangle or destroy his playmates' kites.

KITE, a bird of prey belonging to the falcon family, but inferior to the true falcon in having a much weaker bill and talons. The kites are distinguished by having long, pointed wings and forked tails. They are remarkable for their gracefulness of motion and for their ability to sail or glide for long distances; because of this characteristic, the name was given to the toy kite. The common *European*



THE KITE

kite, or *glede*, is found in almost all parts of Europe, Asia, and the north of Africa. In America there are four species, the *Everglades*, the *Mississippi*, the *white-tailed*, and the *swallow-tailed*. The last-named is the largest and handsomest of the group, measuring four feet or more across the wings; it has a white head, neck, and under parts, and the remaining upper parts, wings, and tail are a lustrous black. Insects, reptiles, and frogs form the principal fare of kites. See **FALCON**.

Scientific Names. Kites belong to the family *Falconidae*. The European kite is *Milvus milvus*. The Everglades is *Rostrhamus sociabilis*; the Mississippi, *Ictinia mississippiensis*; the white-tailed, *Elanus leucurus*; the swallow-tailed, *Elanoides forficatus*.

KITTATINNY, *kit a tin' ie*, **RANGE**. See **NEW JERSEY** (The Land).

KITTIWAKE, a bird belonging to the gull family, which takes its name from its plaintive cry. Like other gulls, it feeds chiefly on fish, and delights in soaring over the waves of the sea. Kittiwakes are found in great numbers in the Arctic regions of Europe and North America. They breed on the coasts of North America from the Gulf of Saint Lawrence northward, wintering on the Great Lakes and on the Atlantic coast as far south as New York, and on the coasts of Great Britain. The nests are made of seaweed, large numbers being placed close together on rocky ledges. The eggs, numbering from three to five, vary in color from buff to grayish-brown and are marked with chocolate spots. The birds grow to a length of sixteen to eighteen inches and

are generally white, with bluish-gray back and wings. The beak is yellow and the legs are brownish-black. In the British Isles, kittiwakes

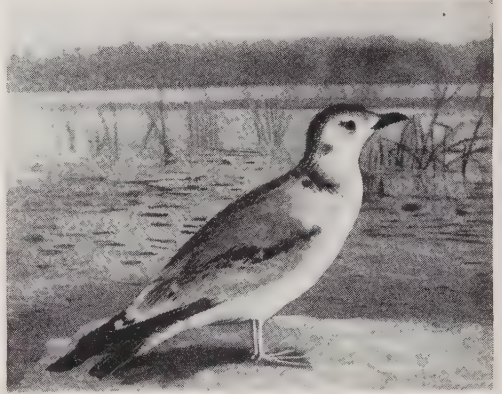


Photo: Visual Education Service

KITTIWAKE

wakes have been ruthlessly slaughtered for the millinery trade. See **GULLS**. D.L.

Scientific Name. The kittiwake belongs to the family *Laridae*. Its scientific name is *Rissa tridactyla*.

KIUSHU, *kyoo' shoo'*, **ISLAND**. See **JAPAN**.

KIWANIS, *kih wah' nis*, **INTERNATIONAL CLUBS**, social-civic organizations in nearly 1,750 cities in the United States and Canada, with a membership of over 102,000. Each club is made up of a composite group of business, professional, and agricultural men, devoted to giving civic and social service to their communities. The membership in each city comprises not more than two of the leaders in each business, profession, or occupation in the city or county. All clubs hold weekly meetings, and attendance is compulsory. The United States and Canada are divided into twenty-nine geographical Kiwanis districts. Each club enjoys autonomy (local self-government), though it functions in connection with a district and an international administration. The name "Kiwanis" is a coined word. The motto of the organization is "We Build." The name and motto are expressions of the constructive, unselfish work of Kiwanians. The first club was organized in Detroit, Mich., in January, 1915.

The international objects which guide the activities of all Kiwanis clubs are these:

To give primacy to the human and spiritual, rather than to the material, values of life.

To encourage the daily living of the Golden Rule in all human relationships.

To promote the adoption and the application of higher social, business, and professional standards.

To develop, by precept and example, a more intelligent, aggressive, and serviceable citizenship.

To provide through Kiwanis clubs a practical means to form enduring friendships, to render altruistic service, and to build better communities.



THE GREAT DISCOVERY



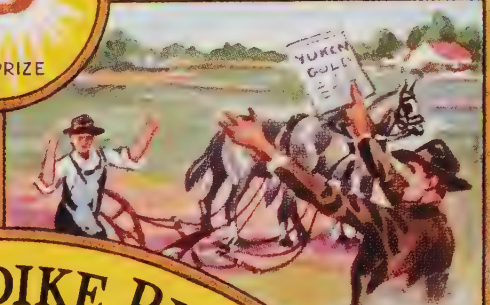
THE SECRET OF GOLD LEAKS OUT



THE PRIZE



PUBLISHED TO THE WORLD



THE RUSH BEGINS

The KLONDIKE RUSH



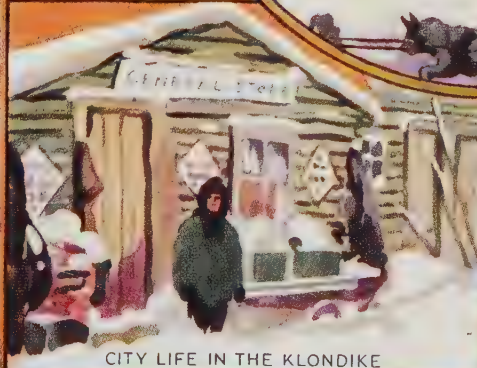
A MINER'S WINDLASS



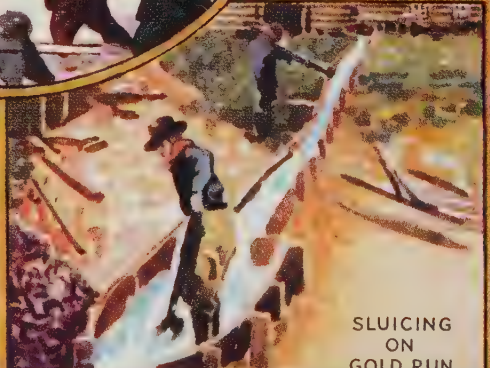
ARCTIC HARDSHIPS
ENDURED IN
CHILKOOT PASS



A TYPICAL CAMP



CITY LIFE IN THE KLONDIKE



SLUICING
ON
GOLD RUN

To coöperate in creating and maintaining that sound public opinion and high idealism which make possible the increase of righteousness, justice, patriotism, and good will.

All social and civic work has been made intensive. The activities of Kiwanis International reach to under-privileged-child work; development of better understanding between the farmer and the city man; the creation of higher business standards; boys' and girls' club work; playgrounds; hospitals; memorials; safety campaigns; tourists' camps; education; beautification of cities; Americanization; good roads; and vocational guidance and placement.

L.D.H.

Related Subjects. Similar organizations are Rotary Clubs and Lions Clubs. They are described in these volumes under their own titles.

KIWI-KIWI, *ke' we ke' we*. See **APTERYX**.

KLAMATH, *klam' ath*. See **INDIANS, AMERICAN** (Most Important Tribes).

KLAMATH PROJECT. See **CALIFORNIA** (Irrigation).

KLAMATH RIVER. See **CALIFORNIA** (Waters).

KLAR RIVER. See **SWEDEN** (Rivers and Lakes).

KLAUSENBURG, *klow' zen boorK*. See **RUMANIA** (Principal Cities).

KLEPTOMANIA, *klep toh ma' ni ah*, an irresistible impulse to steal objects, apart from their value or their worth to the offender. The present-day opinion is that kleptomania is a social malady resulting from improper training, and is curable by training, and that it is not a form of insanity nor closely related thereto.

Kleptomania is not the same as shoplifting. The former is exhibited by persons who steal articles, not for their value nor because of actual need, but because they are acting under an irresistible impulse. Shoplifters commit the act of theft for the same reason that a pickpocket or a burglar steals. Kleptomaniacs sometimes pilfer objects which attract their attention, with no attempt at concealment.

Irresistible impulse is not held a valid defense in courts of law, unless it is shown that the defendant is unable to distinguish between right and wrong. There is a tendency, however, to recognize it as a defense when it is fully established that the accused is unable to control his actions.

W.A.E.

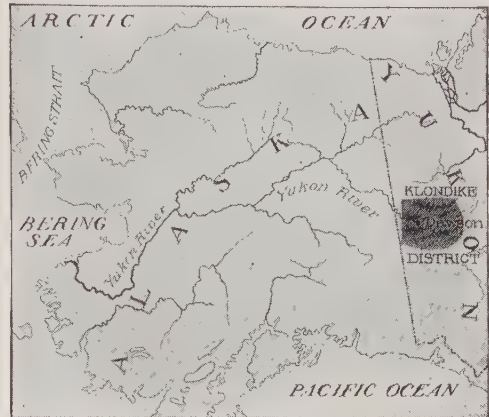
Derivation of Term. *Kleptomania* is derived from two Greek words meaning to *steal* and *madness*. The term has reference to the former belief that the habit is a form of insanity.

KLINGSOR, *kling' zor*. See **PARSIFAL**.

KLINTS, the cliffs of Sweden along the Baltic Sea. See **SWEDEN** (The Land).

KLOET, MOUNT. See **JAVA**.

KLONDIKE, the scene of the greatest "gold rush" the world has ever known, quite eclipsing even the famous California gold boom of 1849. The Klondike is situated in the region surrounding Klondike Creek and its tributaries



THE KLONDIKE DISTRICT

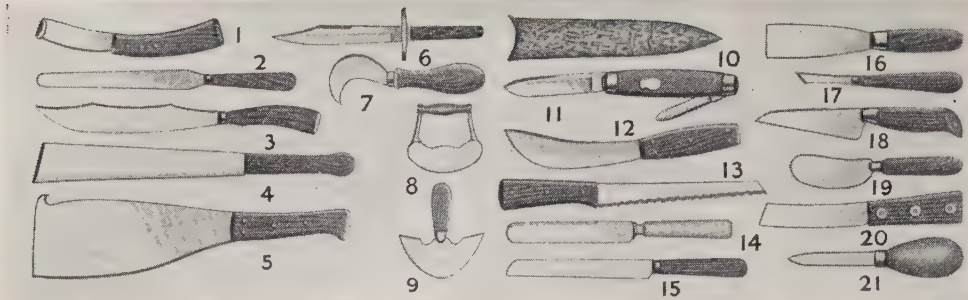
It lies entirely in Canada, in the Yukon district.

in the Yukon district of Canada, to the east of the Yukon River and the Alaskan border line. G. W. Cormack, a prospecting miner and a native of Illinois, discovered rich gold deposits in this territory in 1896. He had located on the Klondike River for the purpose of salmon-fishing, but, finding that unprofitable, he abandoned it to seek gold.

The news of his success could not long be kept secret. The result was a rush of men of every class of society, from all parts of the world. The rigors of the long winters did not deter prospectors; many died from privation and suffering before the land of gold was reached. Juneau and Skagway leaped into prominence as depots and forwarding places for the mines in the interior. Dawson City, the chief town of the territory, had over 500 houses within less than six months from the day the first hut was built; a year later, it was a prosperous city with banks, schools, and churches, the center of one of the richest mining districts in the world.

Within two months of the discovery, gold to the value of \$5,000,000 had been taken out of the district. One miner returned to San Francisco, after a few weeks' absence, with \$150,000. In five years, gold to the value of over \$30,000,000 was taken out of the Klondike mines. Since 1915, however, the quantity has very considerably diminished.

For seven months in the year, the Klondike is an Arctic region. The region possesses little or no agricultural value, and its prosperity depends entirely on its gold supply. The summers are hot and humid, but are not long enough to produce crops. The Yukon



KNIVES FOR ALL USES

(1) Farrier's knife; (2) Palette knife; (3) Carving knife; (4) Corn knife; (5) Cane knife; (6) Hunting knife; (7) Oilcloth knife; (8-9) Chopping knives; (10) Blade of flaked jasper, California Indians; (11) Modern pocket knife; (12) Skinning knife; (13) Bread knife; (14) Table knife; (15) Goldbeater's knife; (16) Putty knife; (17) Wood carver's knife; (18) Felt knife; (19) Paper hanger's knife; (20) Hacking knife; (21) Oyster knife.

district of Canada is governed by a commissioner, with headquarters at Ottawa, but is administered by the Royal Canadian Mounted Police.

Related Subjects. The reader is referred in these volumes to the following articles:

Alaska (Mineral Wealth)	Royal Canadian
Canada (Mining)	Mounted Police
Gold	Yukon
	Yukon River

KLONDIKE RIVER. See YUKON RIVER.

KNEIPP, nipe, SEBASTIAN (1821-1897), a village priest of Bavaria, famous throughout Europe as the "water doctor," because of the water-cure treatment, which he administered, and whose book, *Meine Wasserkur* (*My Water Cure*), went through nearly twenty editions. When he was in school, in 1847, he came upon a small book treating of cold-water cures. One of his fellow students having become ill, in the dead of night the two young men climbed out of the window of the seminary, and at the pump in the yard, Kneipp administered douches to his first patient with favorable results. He lived and practiced his treatment in the little town of Wörishofen in Southern Bavaria, near the River Wettbach, whose waters he employed in his practice. One of his requirements was that patients should walk barefooted in the dewy grass in summer and in the snow in winter. If the grass was not wet enough, a garden hose was played upon it. Kneipp sanitariums have been established in many cities of the world. See HYDROTHERAPY.

KNIFE, nife. Together with razors and scissors, knives are classed by makers and traders as *cullery*. They are grouped into two general divisions: *pocket knives*, which are provided with a spring and the blades of which fold into the handle; and *table knives*, including carving knives, bread knives, cooks' knives, etc.

How Knives Are Made. The best grades of pocket knives are forged by hand. The blades are made from strips of steel of suitable width

and thickness. A blade-maker cuts one of these strips into convenient lengths, heats a portion at the end to a cherry-red, roughly shapes the blade with a hammer, and cuts off from the length of steel enough for the blade and the part which joins it to the handle. This joining section is called the *tang*, and the shaping of the part is known as *tangling*. The rough shaping of the blade at first heat is known as *mooding*. After these two processes are completed, the metal is reheated, the blade is worked again with a hammer, and the nail mark is cut. The latter is a groove along the edge of the blade, in which the thumb nail is inserted to open the knife. This third process is known as *smithing*.

For the purpose of giving the metal lasting qualities, it is hardened and tempered before it leaves the forge for the grinding machine. Hardening is accomplished by bringing the blade to a red heat and dipping it suddenly in cold water. The tang, however, is left soft, that it may be easily filed, drilled, and fitted into the handle. On it, too, is stamped the maker's name. The hardening process leaves the steel brittle, and it must therefore be *tempered*, that is, brought to one of several degrees of hardness. Tempering consists in slowly heating the blade on a steel plate, the degree of temper required being judged by the color. Each color represents a different degree of hardness. Some blades are left a straw color, others a reddish-brown, and so on. After being tempered, the blade is sent to the grinder, who places the tang in a holder, which he grasps with one hand. With the other he presses the blade against a grindstone which revolves at a high rate of speed. A final finishing is usually given the blade after it has been fitted to the handle.

The other parts of the knife are made by the material-maker. He fashions the steel spring which controls the blade in opening and shutting, and the brass or iron lining of the handle (the *scale*), and it is a part of his work

to fasten tips to the outside of the lining when the material which forms the handle does not cover the ends. The various parts of the knife are put together by the *culler*, who also drills, files, polishes, and buffs the handles. Ivory, pearl, silver, gold, tortoise shell, celluloid, rubber, various woods, and other materials are used for knife handles. They are polished on power-driven wooden wheels, which are covered first with leather, and then with a mixture of glue and emery. In buffing, cotton cloth takes the place of the leather, emery, and glue.

Similar processes enter into the manufacture of table knives. The more expensive blades are hand-forged from shear steel, but cheaper ones are forged with machines called *goff hammers*, and are made from cast steel, which is more brittle than shear steel. Power-driven machinery is used in punching holes in the tangs and grinding the blades, but the finishing processes are done by hand. In some cases the blades are rough-ground by being placed in a brass frame, six or more at a time, the frame being so manipulated that it gives them a side-to-side and also a vertical motion on the stone. In American factories the greater part of the work is done by machinery, the cost of the knife increasing with the amount of hand work that enters into its manufacture. The cheapest knives are made in a single piece. Table knives used for cutting such soft substances as bread and meat are given a rougher, thinner edge than the ordinary pocket knife. Knives to be used on the dining table may be wholly of metal, in one piece, and plated either with nickel or silver. B.M.W.

KNIFE RIVER. See NORTH DAKOTA (Rivers and Lakes).

KNIGHT, *nite*. See CHIVALRY.

KNIGHT COMMANDER. See BATH, KNIGHTS OF THE.

KNIGHT GRAND CROSS OF THE BATH. See BATH, KNIGHTS OF THE.

KNIGHTHOOD, ORDERS OF. In medieval Europe, knighthood developed in connection with the feudal system. It was partly religious and partly military. A vow to protect the Holy Sepulcher was considered a fitting act of knightly dedication. The rules of conduct also included a code of honor compelling the knight to conform his actions to those of his own class, especially in regard to respect for women. This code applied only to equals and did not prevent a feeling of disdain for the lower classes. However, the influence of knighthood as a whole was an elevating one in the life of the Middle Ages.

In the modern sense of the term, orders of knighthood are organized bodies of men constituting honorary associations established by a sovereign. In Great Britain there are seven associations of this character; these are the

Orders of the Garter, the Thistle, Saint Patrick, the Bath, Saint Michael and Saint George, the Star of India, and the Indian Empire. The title *knight* in Great Britain is conferred as a mark of honor and as a reward for personal merit or distinguished service, either civil or military. It entitles the holder to prefix *Sir* to his Christian name. Such knights may or may not belong to an order of knighthood; those who belong to no special order are properly called *knights bachelors*. Among the continental orders of knighthood are the Golden Fleece of Spain and Austria, the Seraphim of Sweden, the Black Eagle of Prussia, Saint Andrew of Russia, and the Legion of Honor of France. Each order has its appropriate insignia, including usually a badge or jewel, a collar, a ribbon, and a star. See next page.

In the Middle Ages, there existed various associations or fraternities possessing property and rights of their own as independent bodies, which were known as orders of knighthood. Famous among these were the religious orders founded during the Crusades—the Templars, Hospitalers, and Teutonic Knights.

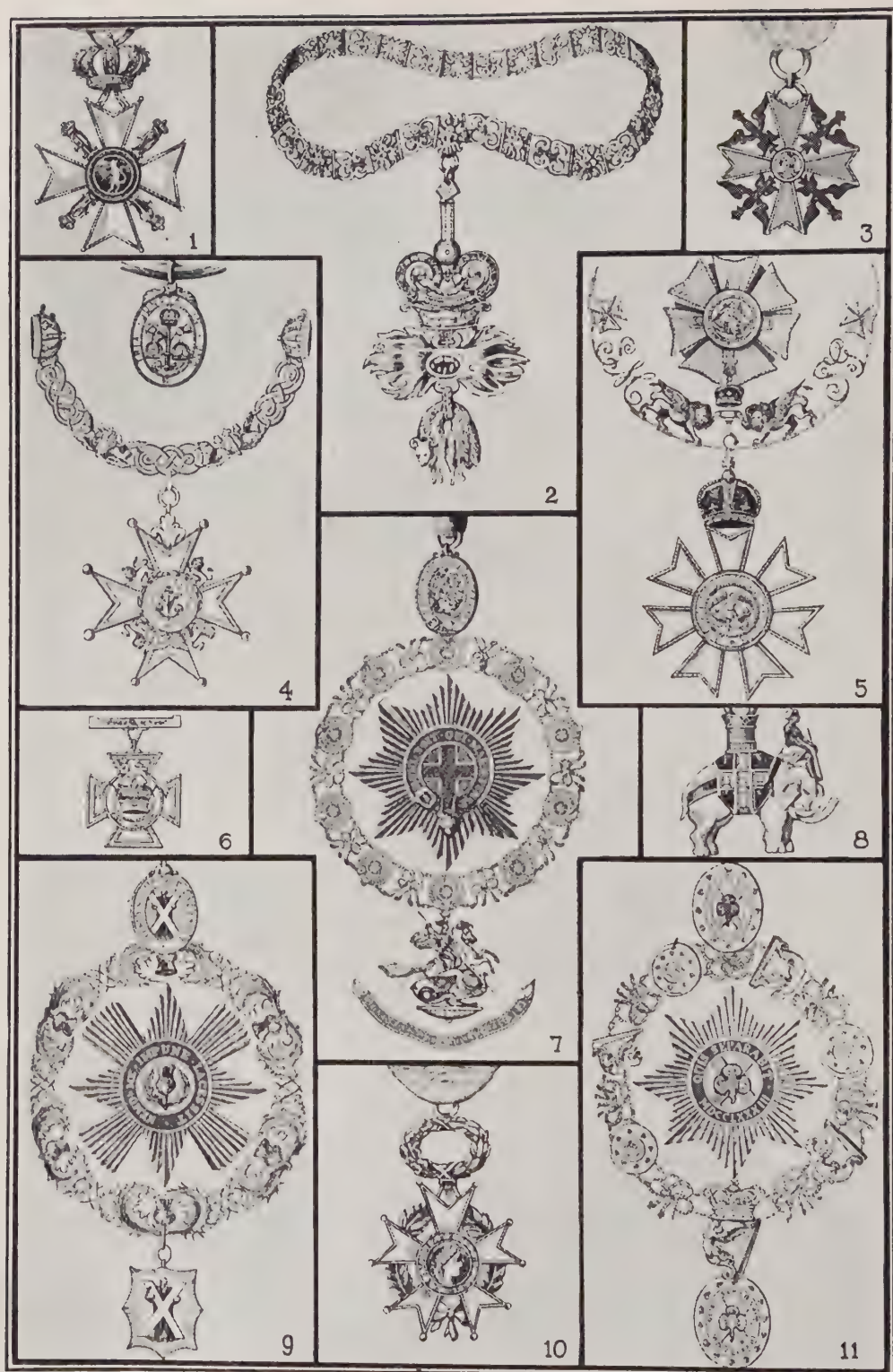
Related Subjects. The reader is referred for further information to the following articles in these volumes:

Bath, Knights of the	Legion of Honor
Chivalry	Templars, Knights
Crusades	Teutonic Knights
Garter, Order of the	Thistle, Order of the

KNIGHTS BACHELORS. See KNIGHTHOOD, ORDERS OF.

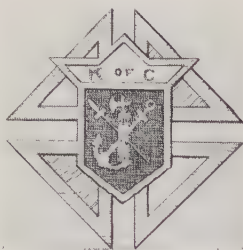
KNIGHTS HOSPITALERS, *hos' pi tal urz*, OF SAINT JOHN, called also KNIGHTS OF SAINT JOHN OF JERUSALEM, and later KNIGHTS OF MALTA, a religious military order founded in a monastery at Jerusalem in 1048. The monastery was dedicated to Saint John the Baptist, and the monks were called Brothers of Saint John, or Hospitalers, for their early work was limited to hospital service, in caring for the poor and the ill and in assisting pilgrims. During more than 500 years the order fought the Mohammedans from its headquarters in Malta. When Napoleon captured that island in 1798, the Knights turned to Russia and assisted that country against France. England gained Malta in 1800, and from that time the order was undisturbed on the island, but it ceased to be a military or political body. The Pope was commissioned to choose its grand master, and it became essentially a religious order, returning to its earliest functions of hospital service. Records of the Knights dating back to the twelfth century are preserved in Malta. See MONASTICISM; also MALTA.

KNIGHTS OF COLUMBUS, a fraternal and benevolent organization to which male members of the Roman Catholic Church are eligible. It was founded in 1882 in New Haven, Conn., with the object of furnishing financial



Emblems of Knighthood. (1) Order of Saint Olaf, Sweden. (2) Golden Fleece, Austria. (3) Black Eagle, Prussia. (4) Order of the Bath, Great Britain; upper, diplomatic and civil; lower, collar and badge. (5) Star and collar, Order of Saint Michael and Saint George. (6) Victoria Cross, Great Britain. (7) Order of the Garter, Great Britain. (8) Order of the Elephant, Denmark. (9) Order of the Thistle, Great Britain. (10) Legion of Honor, France. (11) Order of Saint Patrick, Ireland. (See page 3805.)

aid to its members and their beneficiaries and of establishing and promoting social and intellectual fellowship. The society is governed by a supreme council, the members of which are elected by the various state councils. Headquarters of the association are maintained at New Haven, Conn., with branches in every state in the Union, in every Canadian province, in Cuba, Porto Rico, Newfoundland, the Philippine Islands, and Alaska. During the



EMBLEM

Horizontal shading represents gold; crosshatch shading, blue; diagonal shading, red; unmarked spaces, white.

World War, the organization did notable work in France in behalf of the soldiers of the Allies. See FRATERNAL SOCIETIES.

KNIGHTS OF LABOR, a national labor organization of the United States, established in 1869 at Philadelphia, by a disbanded union of garment-cutters, in an effort to afford protection to the working classes. At first, everything about the society except its symbol, a line of five stars, was kept secret, because of the failure of other such unions and because many employers were opposed to organized labor. Anyone over sixteen, with the exception of lawyers, bankers, liquor dealers, and gamblers, was admitted. In seventeen years the membership grew to 700,000, but because of serious disagreements within the union, this number has diminished until it ceased to be effective. See LABOR ORGANIZATIONS.

KNIGHTS OF MACCABEES. See MACCABEES OF THE WORLD, KNIGHTS OF.

KNIGHTS OF MALTA. See KNIGHTS HOSPITALERS OF SAINT JOHN.

KNIGHTS OF PYTHIAS. See PYTHIAS, KNIGHTS OF.

KNIGHTS OF THE GREAT FOREST, since 1928 the official name of the organization known as the Ku-Klux Klan (which see).

KNIGHTS OF THE ROUND TABLE. See ARTHUR, KING; ROUND TABLE.

KNIGHTS TEMPLARS. See MASONRY; TEMPLARS, KNIGHTS.

KNITTING MACHINE, a mechanical device for knitting hosiery and underwear. The most common form now in use is circular; the needles are arranged in rows on a rounded frame, and a round web is produced. The needles have a straight up-and-down motion, produced by cams; each needle has a hook at the end, with which it draws down the thread and makes a loop. As a stocking or other garment is being knitted, the web extends downward through the circular opening be-

tween the needles; it has a weight attached to its lower end to keep it in position.

The adjustment of these machines has been brought to a remarkable state of perfection, and when operated by power, four of them can be tended by one boy. The first knitting machine was invented by William Lee, an Englishman, in 1589. Early in the eighteenth century, an improved form was introduced into the United States; the great economical value of such a machine is clearly shown by the inventive genius of Americans, who within the nineteenth century secured nearly 2,000 patents covering improvements in it. In 1831 power was first applied to knitting machines, at Albany, N. Y. Formerly, they were everywhere run by hand power.

KNOCK-OUT-DROPS. See CHLORAL.

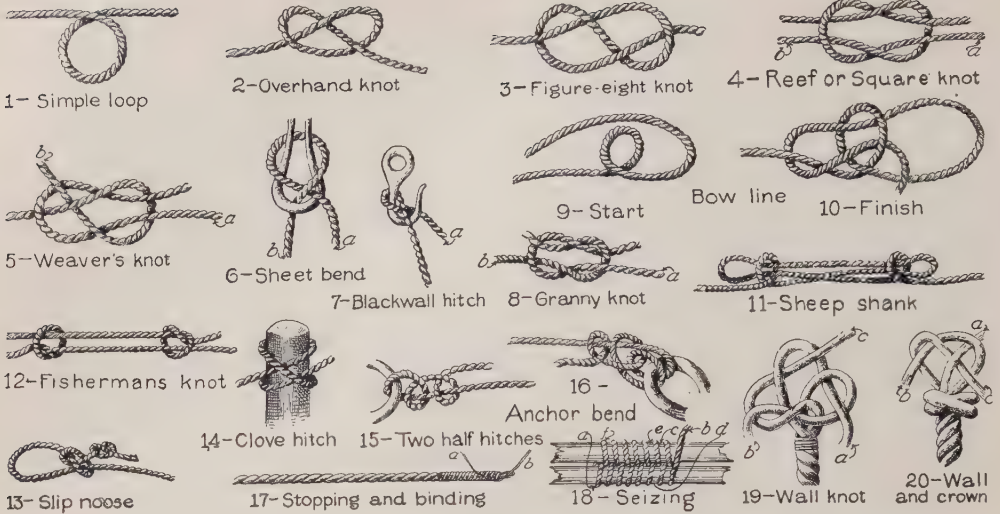
KNOT, *not*, a unit of speed, used to designate the number of nautical miles per hour that a ship travels. That is, a ship whose rate of motion is twenty nautical miles per hour has a speed of twenty knots. In ordinary speech, however, *knot* and *nautical mile* are used interchangeably. The nautical mile used by the United States navy is 6,080.27 feet, "the one-sixtieth part of the length of a degree on the great circle (circumference) of a sphere whose surface is equal to the surface of the earth." The British admiralty uses exactly 6,080 feet. This is equal to about 1.15 land miles.

In the rope to which the old-fashioned ship's log was attached, pieces of string were inserted; one piece marked the first knot, two pieces the second, and so on. The knots were usually forty-seven feet three inches apart; if, at the end of twenty-eight seconds, the log had pulled out five knots, the ship was moving five miles an hour. (The ratio of 28 seconds to 1 hour corresponds to the ratio of 47 feet 3 inches to 6,080 feet.) The fastest ocean vessels of to-day move at speeds varying from twenty-five to twenty-eight knots. See MILE.

KNOTGRASS, KNOTWEED, OR DOOR-MAT, a trailing weed belonging to the buckwheat family. It is one of the most widely distributed plants in the world. Knotgrass grows low on the ground, in trampled places or in cultivated fields, and bears trailing, many-branched stems which form a thick mat. Clusters of two or three small flowers of pale greenish-pink grow between the upper surfaces of the leaves and the stems. B.M.D.

Scientific Name. The scientific name of knotweed is *Polygonum aviculare*.

KNOTS, in thread, string, or rope, are made in many ways, especially by sailors. The harder you pull the cords in a good knot, the stronger it becomes. For most purposes a knot must be easy to tie and to untie. The clove hitch (Fig 14), for instance, is tied with only two motions and is untied as easily, but it is



HOW TO TIE KNOTS

so strong that it is used to fasten large steamships to their piers.

How to Tie Knots. (1) This is a simple loop, the basis of all knots, called by sailors a *bight*.

(2) If you slip one end of the cord through the loop, you have an *overhand knot*, the one knot that everyone knows how to make.

(3) If before you put the end through the loop you put it around the other end, you will have a *figure eight*.

(4) Put the end *a* over, under, and over the end *b*, then bend both upward and do it again. This is one of the best and simplest knots, but be careful not to make it a *granny* (8).

(5) Put the end *a* over and under the end *b*, then put *b* over itself and under *a*, then *a* under *b*, and over and through the loop; or, do as in (6).

(6) This method of fastening a rope to a hook is in principle the same as (5). Put the rope all the way around the hook from *a*, and in finishing the loop bring the end *b* through the hook.

(7) This hitch is used in lifting heavy boxes. It is merely a loop through which the hook is inserted.

(8) Starting as in (4), reverse the second operation, putting *b* over, under, and over *a*. This is not as good a knot as the *reef* (4).

(9), (10) With the loop as in (9), put the loose end up through it, around the other end, and back through the loop. Sailors painting the outside of a ship sit in a *bow-line* knot.

(11) To shorten a rope temporarily, make these two loops around the ends of a larger loop.

(12) Each of the ropes is fastened around the other in an *overhand knot* (2).

(13) This is a loop which works like a lasso. Instead of the metal ring, we have an *overhand knot*. Another *overhand* prevents unfastening.

(14) To fasten a boat, slip on the spile a loop having the loose end of the rope underneath, and follow it by another.

(15) The two half-hitches, to fasten a boat to a ring, are really two *overhand knots* (2).

(16) Pass the end of the rope through the ring

twice, making a loose loop, then around the other end and through the loop, finishing with a half-hitch (15).

(17) This is a method of fastening together the loose ends of a rope with thread. The thread is laid along the rope a few inches, as shown by the longer dotted line, then wound tightly to the end of the rope. The end *a* is then looped about *b*, threaded back beneath the winding, as shown by the shorter dotted line, and drawn tight.

(18) This is a way that sailors fasten together two ropes or cables with a smaller one. At *a* an eye is spliced (see *SPLICING*) about one of the cables. The cord is led back and forth around the two cables, very tightly, to *b*, then into the empty space *c*, around to *d* and *e*, and so on, till it reaches the cord *f*, under which it is led, the whole being finished with a *clove hitch* (14).

(19) This is to fasten the loose ends of the strands of a rope. Make a fold with *a*, loop *b* about the end of it, pass *c* around the end of *b* and through the loop of *a*, and tighten the knot evenly.

(20) Make the wall knot as in (19), then cross *b* over *a*, pass *c* around the end of *b*, under *a*, and over *b*. Tighten evenly.

KNOW-NOTHINGS, a political party in the United States, secret in character, which flourished from 1852 to 1860. It protested against immigration, and for that reason was called also the "American" party (which see); it opposed the Church of Rome, and this principle alienated voters who otherwise might have joined it. Meetings were in secret, and the measures promoted were never discussed openly; when one not a member asked any question regarding its policies, the reply was, "I don't know." Constant repetitions of this phrase gave the party its popular name. In 1854 the Know-Nothings carried Massachusetts and Delaware, polled over 125,000 votes in New York, and gained a considerable following in



Photo: Brown Bros.

JOHN KNOX PREACHING

[Photograph from a contemporary painting.]

the South. By coalitions its members merged by the year 1860 with other organizations, principally with the Republicans and Democrats, on war issues. See **POLITICAL PARTIES**.

KNOX, *noks*, **HENRY** (1750-1806), an American general and statesman, who became one of George Washington's trusted friends. He entered upon a military career at an early age, and at the beginning of the Revolutionary War distinguished himself as an engineer and artilleryman. In 1775 he was appointed commander of artillery and rose rapidly to the rank of major general. He served under Washington at the battles of Trenton and Princeton and directed the artillery at Brandywine and at Monmouth. As a trusted member of Washington's staff, he was appointed to receive the surrender of the British forces in New York. Knox became Secretary of War in 1785, before the adoption



Photo: U & U

HENRY KNOX

First Secretary of War of the United States.

of the Constitution, and in 1789 was appointed to the same office by Washington.

KNOX, **JOHN** (1505-1572), the leading spirit of the Protestant Reformation in Scotland, a man whose fearlessness, resolution, and stern convictions of righteousness and of duty made a lasting impression upon the Scottish people. In the minds of his countrymen, John Knox, more than any other man, shaped the religious individuality of Scotland. He was born at Giffordgate, near Haddington. Much obscurity surrounds his early life, but it is supposed that he attended the universities of Glasgow and of Saint Andrews, though he was a graduate of neither. At some unknown date, he was ordained for the priesthood, but before the year 1544 he embraced Protestantism, for at that date he appeared as the friend and companion of the famous Scottish reformer, George Wishart.

In 1546 Wishart was tried for heresy, and condemned to be burned at the stake by order of Cardinal Beaton, Roman Catholic archbishop of Saint Andrews. Not long afterward, the cardinal was murdered by friends of Wishart, and Knox began his career as a leader in the Reformation by preaching to the Protestants who had taken refuge in the archbishop's castle in Saint Andrews. A year later he was vigorously upholding the new doctrines as pastor of the parish church in the town, but his activi-

ties were cut short in July, 1547, when Saint Andrews surrendered to a French fleet.

With others, Knox was captured, and for nearly two years was kept a prisoner on board the French galleys. In 1549 he was set at liberty at the request of King Edward VI of England, and, having taken up his residence in England, was appointed one of the king's chaplains. He then took a leading part in the English Reformation, and was active as a preacher until the accession of the Catholic Queen Mary drove him to the Continent in 1554. In 1556 he became pastor of the English church at Geneva, Switzerland, where he remained for three years.

The year 1559, the date of his return to Scotland, marks the beginning of a career of triumph for Knox. At Perth, where he preached a stirring sermon on the "Idolatry of the Mass," the people were roused to such a pitch that they attacked the churches, overturned altars, broke the images, and destroyed monasteries. The flames of the religious revolution were soon raging throughout the country, and in 1560 the Protestant faith was formally adopted as the state religion. *The Confession of Faith* and *First Book of Discipline*, issued at that time, were primarily his work.

A new crisis was reached, however, when, in 1561, Mary Queen of Scots returned to Scotland. She was devoted to the Roman Catholic Church, and there was not one bond of sympathy between her and the stern and unyielding reformer, who preached against her with a bitterness that alienated the more moderate leaders of his own party. Knox was forced into comparative privacy between 1563 and 1565, but Mary, by her reckless marriage with Lord Darnley, and her unfortunate one with the Earl of Bothwell, brought upon herself her own undoing, and after her abdication, in 1567, Knox regained his former power and influence. During the civil war that broke out in Scotland in 1570, the aged reformer retired to Saint Andrews to escape threatened assassination, and there, in the church where he had begun his work as a minister, he preached his last sermons. In 1572, "weary of the world," he returned to Edinburgh to die. His work was accomplished; Scotland had been won permanently for Protestantism.

His Works. In his *History of the Reformation of Religion in Scotland*, Knox wrote his own biography; the latter part was compiled from notes found after his death. Famous among his other works is his *First Blast of the Trumpet against the Monstrous Regiment* (regimen, or government) of Women, directed against Mary of England, Mary of Guise, and her daughter, Mary Queen of Scots. G.W.M.

Related Subjects. The reader is referred in these volumes to the following articles:

Mary (I, England)
Mary Stuart

Reformation, The
(Scotland)

KNOX, PHILANDER CHASE (1853-1921), an American political leader and lawyer, was born in Brownsville, Pa., and educated in Ohio. After developing a large practice in Pittsburgh as a corporation lawyer and serving as assistant United States district attorney, he became Attorney-General of the United States in President McKinley's Cabinet, in April, 1901. In this position he was retained by President Roosevelt. In 1904 Knox was appointed to the United States Senate from Pennsylvania, to fill the unexpired term of Matthew S. Quay, and in 1905 was elected for a full term. He became Secretary of State in March, 1909, and in 1916 was again elected Senator. He died in that office.

KNOX COLLEGE. See ILLINOIS (Education).

KNOXVILLE, TENN., the county seat of Knox County, is an educational and commercial city in the east-central part of the state. It is on the right bank of the Tennessee River, four miles below the junction of the French Broad and Holston rivers, and is centrally located in a picturesque, hilly valley at an altitude of 1,000 feet, between the Smoky Mountains on the east and the Cumberland Mountains on the west. The elevation and the protection of the highlands give the place a delightful climate. Population, 1928, 105,400 (Federal estimate).

Transportation. Knoxville is on two trunk-line railroads, the Southern and the Louisville & Nashville. Their lines radiate from Knoxville in nine different directions, making contact with all large markets. A splendid steel railroad bridge carries vehicular traffic across the river between Knoxville and South Knoxville.

Industries. A great variety of valuable timber, coal from rich coal fields (the Coal Creek and Jellico districts), iron ore, pottery clays, marble, and zinc are the raw materials easily accessible for the trade and manufactories of Knoxville. Textile plants represent the largest industry of the city, the annual output of these mills being valued at more than \$19,000,000. Large quantities of Tennessee marble are obtained from the quarries in and near the city; the value of the annual production is more than \$6,000,000. Other important enterprises of Knoxville include the metal-working and wood-working industries. In all, the city has more than 350 manufacturing plants. It is also a wholesale center of considerable importance. Large repair and freight-classification yards of the Southern Railroad are located at Knoxville. In the vicinity are hydro-electric plants with a potential horse power of over a million and a half.

Education. Knoxville is the seat of the University of Tennessee; and Knoxville College, a United Presbyterian school for colored students, is located here. The city also contains the Tennessee School for the Deaf and a branch of the State Hospital for the Insane.

History. The first building on the site of Knoxville was a blockhouse erected in 1791

by General James White to protect settlers against attacks of Cherokee Indians. Barracks were later erected, and for many years the settlement, named in honor of General Henry Knox, the first Secretary of War, was frequently attacked by Indians. It was the capital of the "Territory South of the Ohio" from 1792 to 1796, and was the state capital until 1811, and again in 1817. A city charter was granted in 1815. Knoxville has the city-manager form of government.

H.M.W.

KOALA, *ko a' lah*, a small, pouched mammal of Australia, resembling the bear in appearance and the sloth (which see) in its lethargic dis-



Photo: U & U

NOT A "TEDDY BEAR" OR A STUFFED TOY

A koala, a rare Australian animal, which, like that other strange Australian product, the kangaroo, carries its young in a pouch.

position. It is sometimes called the *Australian bear*, *pouched bear*, or *native sloth*. It is about twenty-four inches long and twelve inches high at the shoulder, and has only a suggestion of a tail. Its thick, soft, woolly fur is ashen-gray above and yellowish-white below. The head is thick, the snout short, and the mouth provided with cheek pouches. The long toes of the koala enable it easily to grasp the branches of trees, from which, like the sloth, it often hangs with its back downward. It sleeps in the daytime in the top of some blue-gum (eucalyptus) tree, on the leaves of which it feeds almost exclusively, but it also roams around on the ground, digging up roots. The

mother carries her cub in her pouch when it is very young, and when old enough to leave the pouch, it rides on her back. The natives of Australia eat the flesh of the koala, and kill it with clubs. See MARSUPIALS. L.H.

Scientific Name. The koala belongs to the family *Phascolarctidae*. It is known as *Phascolarctos cinereus*.

KOBE, *ko' be*, a Japanese seaport. See JAPAN (The Cities).

KOBOLD, *ko' bold*. See BROWNIE.

KOCH, *koK*, ROBERT (1843-1910), a German physician famed for his researches in the field of bacteriology, but especially for his discovery, in 1882, of the specific germ which causes tuberculosis of the lungs (see TUBERCULOSIS). He also identified the bacillus which produces Asiatic cholera, and devised a method of inoculation to prevent anthrax (which see). In the year 1890, it was reported throughout the world that Dr. Koch had discovered a cure for one of the greatest enemies of the human race—consumption. What he actually accomplished was the preparation of an extract, or lymph, obtained from bacilli, which is chiefly valuable as a test in diagnosing cases of tuberculosis. His work included



ROBERT KOCH

also a study of blood infections in East Africa and of the West African "sleeping sickness," and the identification of the parasites which cause "coast fever." In Germany he was honored by appointment to a professorship in the University of Berlin (1885). In 1905 he was awarded the Nobel prize for medicine. See BACTERIA AND BACTERIOLOGY; DISEASE (Germ Theory of Disease).

KOCHANSKA, MARCELLINE, the real name of Marcella Sembrich (which see).

KODAK. See CAMERA; PHOTOGRAPHY; EASTMAN, GEORGE.

KODIAK, *kohd yak'*, the largest of the Alaskan group known as the Kodiak Islands, situated east of the Alaska Peninsula, and separated from it by Shelikof Strait. It has an area of about 36,000 square miles, nearly as great as that of the state of Indiana. Lumber is abundant, the harbors are good, and salmon is caught in great quantities. Cattle-farming has been introduced with success by the United States Department of Agriculture. The largest species of bear in the world, the Kodiak, or Kadiak, is found on this island. Kodiak

village (population, 375) is the largest town. See ALASKA.

KODOK, headquarters of a province in Egyptian Sudan. It is on the Upper, or White, Nile, about 459 miles south of Khartum. Built on a flat peninsula connected with the shore by a narrow strip of land, Kodok has a most unhealthful situation. A usual temperature of 98° F. and the unpleasant dampness are made more intolerable by swarms of mosquitoes.

The post was founded in 1865 by the Egyptian government, and called Fashoda. For years it was the center of a very prosperous slave trade. However, in 1881, during the native uprising, the town was completely deserted, and not reoccupied until 1898, when Captain J. B. Marchand, in charge of a French expedition in East Africa, took it over in July. Great Britain, as protector of Egyptian interests in the Sudan, then demanded the immediate withdrawal of the French. The tense situation lasted until December, when, in return for liberal concessions, France withdrew. The name was changed to Kodok in 1904.

KOENIG, *kur' niK*, FRIEDRICH. See PRINTING PRESS.

KOHINOOR, OR **KOHINUR**, a Persian word which means *mountain of light*, is the name of a famous diamond included in the British crown jewels. According to tradition, it was found in India long before the Christian Era, was handed down through a long line of Indian princes, and came into the possession of England in 1849, through the conquest of the Punjab, or Northwest India. The following year it was presented to Queen Victoria by the East India Company. In its Indian cutting it weighed 186 carats. After being brought to London, it was recut, in 1852, to 106 carats, but what it

lost in weight it gained in brilliancy. One may see a model of it to-day in the Tower of London. See DIAMOND (Famous Diamonds). T.B.J.

KOHL-RABI, *kole rah' bie*, or, more properly KOHL-RUBE, is a cultivated variety of

the cabbage plant, in which the stem above the ground enlarges into a bulblike growth. It is used as a vegetable and resembles in taste the rutabaga, or Swedish turnip. Leaf stalks spring from the round formation and add to the unusual appearance of the plant. Kohl-rabi is cultivated like cabbage (which see), but is more familiar to Europeans than to Americans. B.M.D.

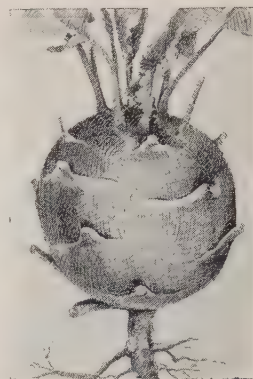
Scientific Name. The kohl-rabi belongs to the family *Cruciferae*. Its botanical name is that of the cabbage, *Brassica oleracea*.

KOKOMO, IND. See INDIANA (back map).

KOLINSKY. See FUR AND FUR TRADE (Imitations and Trade Names).

KÖLN, the German name of Cologne (which see).

KONGO, a form of the word *Congo* (which see), now seldom used.



KOHL-RABI



THE KODOO

Photo: U & U

KONIA, *ko ne'-ah*. See TURKEY (The Cities).

KÖNIGSBERG, *kur' niKs behrK*. See GERMANY (Principal Cities).

KODOO, OR **KUDU**, an African antelope about four feet high and eight feet long. It ranges from Cape Colony to Somaliland, in the east-central part of the continent, but is now rare in South Africa. The body is of a grayish-brown color and is marked in both sexes with white vertical lines on the sides and a narrow white stripe along the back. The male has screwlike horns about four feet in length, but

the female is hornless. The flesh of koodos is greatly liked by Africans. See ANTELOPE. W.N.H.

Scientific Name. The koodoo belongs to the family *Bovidae*. Its scientific name is *Strepsiceros kudu*.

KOOKABURRA, *kook' ah bur ah*. See AUSTRALIA (Animal Life).

KOOTENAI, *koo' ten ay*, **RIVER**. See MONTANA (Rivers).

KOOTENAY, a variant of *Kutenai*. See INDIANS, AMERICAN (Most Important Tribes).

KOOTENAY RIVER AND DISTRICT, an important Canadian river and the region drained by it.

The River. Like the Columbia, of which it is one of the largest tributaries, the Kootenay rises in the southeast part of British Columbia, on the western slope of the Rocky Mountains. The Columbia first flows north, makes a sharp bend, and then flows south, whereas the Kootenay first flows south for about 200 miles and then turns north to meet the Columbia. In traversing this figure *U*, from its source to its mouth, the Kootenay flows about 450 miles, but the distance in a straight line is no more than 140 miles. The base of the *U*, an irregular semicircle about 125 miles long, lies in the state of Idaho. Reëntering British Columbia, the river forms what is known as the South Arm of Kootenay Lake, and running north unites with the North Arm; then turning west, it empties into the Columbia River about twenty-five miles north of the international boundary. Navigation of the river is practically impossible, because of its rapid flow, many sharp turns, and numerous rapids.

Kootenay District. The Kootenay District, or Kootenay Country, as it is often called, is a triangular section in the southeast corner of British Columbia. It comprises all of British Columbia south and east of the Big Bend of the Columbia River, thus including about 7,500 square miles of the Columbia's drainage basin and 15,000 square miles—practically the whole—of the Kootenay's basin. (See map, CANADA).

Both in East and West Kootenay are large areas of arable lands. Numerous lakes and streams provide water for irrigation wherever it is necessary, and also furnish cheap transportation during the open season for navigation. Transportation is also provided by the Kettle Valley Railway and by the main line and the Crow's Nest Pass branch of the Canadian Pacific. Fruit-growing, dairying, and mixed farming are all carried on with profit. Much of the land is well timbered, and lumbering is second among the industries. The chief industry, and the one for which the Kootenay is most famous, is mining. Gold, silver, lead, zinc, and copper are plentiful in the mountains, and coal is found in the valleys and passes. The development of the coal fields in the Crow's Nest Pass and the Nicola Valley, and of the metal mines in the Slocan Lake district, is chiefly responsible for the Kootenay's remarkable increase in population since the beginning of the twentieth century. Its chief

cities are Fernie, Nelson, Revelstoke, Rossland, and Trail.

One of the most beautiful stretches of country in North America, one of the richest in mineral and timber wealth, and in fertility of the soil, is the long valley extending from the Big Bend of the Columbia River southward into the United States, the valley in which rise both the Columbia and the Kootenay. At the Canal Flats, near the source of the Columbia, the two rivers flow within a few hundred yards of each other, one to the north, the other to the south. At this place a canal was made, uniting the two rivers, but as it was found to be changing the flow of water, only one boat was taken through, and the canal was abandoned. West of the Purcell Range is another splendid valley, in which lie the Kootenay Lakes, and still farther west, beyond the Selkirk Mountains, is the valley of the Arrow Lakes. This region of alternate mountains and valleys is still inhabited by wild game of many kinds, and is a favorite resort for hunters and lovers of magnificent scenery.

KOPECK, *ko' pek*, a standard coin of Russia. See MONEY (Foreign Monetary Standards).

KOPJE, *kop' ih*. See TRANSVAAL, THE (The Land).

KORAN, *ko rahn'*, the sacred scripture of the Mohammedans, accepted by the faithful as the revelation of Allah (God) to Mohammed. They overlook its fables, and profess the belief that in the beginning it was written in golden rays on a great tablet in Heaven, and was then communicated to Mohammed by the angel Gabriel. The Koran explicitly states that it was written by piecemeal and *sent down*, or revealed, during a period that covers Mohammed's entire prophetic career, from A.D. 610 to 632, the first parts being dictated while he was at Mecca, and the remainder after his flight to Medina.

At the time of the first revelations, Mohammed named the book *The Koran*, meaning *that which is to be read*, and after his death its fragments were ordered to be collected by Abubekr, Mohammed's father-in-law. Its authorized text was produced under Caliph Othman in A.D. 652.

Size and Divisions. The Koran is about the size of the New Testament, and is divided into 114 *suras*, or chapters, which vary in length from many verses to only a few lines. It is written in pure Arabic, without connecting narrative or story.

Its Doctrines. The leading doctrine of the Koran is the Oneness of God, clearly laid down by the statement, "God is God and Mohammed is His Prophet." It dwells on the resurrection of the body, prescribes fasting, the pilgrimage to Mecca, and the giving of alms, which is made obligatory. Prayer is called the key to paradise, and it is prescribed five times a

day, with the suppliant's face turned toward Mecca. It follows the Mosaic law concerning inheritance, divorce, and polygamy, and its moral precepts would enforce the virtues of humility, temperance, courage, and justice. Death in the cause of religion is extolled; it is promised that the faithful who die in battle against "infidels" shall have greatest future glory, and this adds a frenzy to ordinary zeal in all "holy" wars waged by Mohammedans.

Influence of the Koran. The Koran controls the lives of at least 200,000,000 of the human race, and Mohammedan children use it as almost their only schoolbook. The doctrine that it is an inspired book has been assailed at times, even among Moslems; in 1842, however, Harun II forbade all discussion of the book, and it has since been revered by Mohammed's followers as the only religious authority.

Related Subjects. The reader is referred to the following articles in these volumes:

Mohammed	Religion (Religions of
Mohammedanism	the World)

KOREA, OR COREA, *ko re' ah*, formerly a small, independent kingdom of Eastern Asia, occupying the peninsula between the sea of Japan and the Yellow Sea. When the country passed under the government of Japan, in 1910, the name Korea was abandoned, the peninsula becoming officially known as *Chosen*. For description, see *CHOSEN*.

KOREA, GULF OF. See *YELLOW SEA*.

KORZENIOWSKI, *kor zen wv' ski*, **THEODOR JOSEF KONRAD**, the real name of the novelist Joseph Conrad (which see).

KOSCIUSKO, *kos i us' ko*, **MOUNT.** See *AUSTRALIA* (Surface Features).

KOSCIUSKO, **THADDEUS** (1746-1817), a Polish patriot, distinguished for his valiant service to the United States in the Revolutionary War. He was born in Lithuania of a noble but impoverished family, received his military training at Warsaw and Versailles, and became a captain in the Polish army.

In 1776 his sympathy for the American patriot cause led him to embark for America, where he served in the Revolutionary army. He was appointed chief engineer in charge of construction at West Point, and became adjutant to General Washington.

In 1786 Kosciusko returned to Poland, and in 1789 was appointed major general of the reorganized Polish army. In 1794 he became commander in chief and dictator of the Polish insurgent forces, and was victorious over the Russians near Cracow. In 1794, at the Battle of Maciejowice, he was overwhelmed by superior forces, wounded, and captured. Kosciusko was confined in Saint Petersburg (now Leningrad) for two years, but was liberated on the death of the Empress Catharine. In 1817 he freed the serfs on his estate

in Poland, and died in the same year at Solothurn, Switzerland, from injuries sustained in a fall from his horse. See *POLAND* (History).



Photo: Brown Bros.

THADDEUS KOSCIUSKO

The spelling of the name below the portrait is the Polish form of the word.

KOSHER, *ko' shur*, a Hebrew word meaning *clean and wholesome*, is applied by Jews to articles of food, particularly meat, that have been prepared for consumption in a manner which conforms to provisions laid down in the Talmud (which see). To eat food not so prepared is unlawful to orthodox Hebrews. Flesh to be eaten must be from animals which have been killed according to traditional ritual, and before being consumed, must be treated by washing, soaking, and salting until all traces of blood are removed. Neither milk nor any of its products may be eaten with meat, which cannot, therefore, be cooked in butter. Restrictions are so specific that orthodox members of the faith will buy meat only in kosher markets.

Animals which are forbidden in the Law to be eaten are named in *Deuteronomy* (xiv) and *Leviticus* (xi).

KOSSOVO, *kos' o vo*, **BATTLE OF.** See *SERBIA* (History).

KOSSUTH, *kosh' oot* (but more commonly *kah sooth'*), **LOUIS** (1802-1894), a Hungarian pa-

triot, statesman, and orator, and the national hero of Hungary, was born in Monok. His parents were of noble descent, and his father was a prominent lawyer. He received his education at Budapest University, and in 1832 entered the upper house of the Hungarian Diet as a substitute for an absent member. The young man at once joined the movement for political reform, and soon acquired a strong influence. For publishing parliamentary debates, he was condemned to imprisonment for four years, but was released after one year. In 1841 he became editor of the *Pesth Journal*, an extremely liberal paper, and at the outbreak of the revolution in Vienna, he became the Hungarian leader.

In September, 1848, Kossuth was made president of the committee of national defense, and thereafter he kept the direction of the government in his own hands. He issued the declaration of Hungarian independence in 1849, and was appointed responsible governor; when the intervention of Russia made further efforts useless, he resigned in favor of Görgey, who then surrendered to the Russians. Kossuth went to Turkey, where he was virtually kept a prisoner, but was liberated in 1851, and sailed on the *Mississippi* for America as the guest of the nation, the vessel having been dispatched by the United States government for that purpose. He made many speeches in American cities, urging the claims of Hungarian independence. In 1852 he returned to Europe, but was never reconciled to the union between Hungary and Austria, and preferred to live in Italy. He died in Turin, and his body was taken to Pesth. At the time of his burial, the whole Hungarian nation united to do him honor.

KOUMISS, or **KUMISS**, *koo' mis*, a fermented beverage made in Russia from mare's milk. It is usually made by placing old or sun-dried koumiss deposit in a vessel and adding to it freshly secured mare's milk. During the process of fermentation, which requires from thirty to forty-eight hours, the vessel is violently shaken at intervals, which churns the butter fat. This fat is then removed. Elsewhere in Europe, and in America, koumiss is made by adding sugar of milk to cow's milk, allowing the mixture to ferment in open tanks, removing the casein and butter fat, and putting the liquid in bottles during fermentation.



Photo: Brown Bros.

KOSSUTH

Koumiss is highly nutritive, is easily digested, and is regarded as a valuable portion of the diet for dyspeptics, tubercular patients, and those who are recovering from acute fevers. One quart of koumiss contains four ounces of solid food; the alcohol content is from one to three per cent. The beverage tastes something like buttermilk.

KOVNO, *kov' no*, capital of Lithuania (which see).

KRAAL, *krahl*, a Zulu village. See ZULU-LAND.

KRACOW, a variant of *Cracow*. See POLAND (The Cities).

KRAFFT, ADAM. See SCULPTURE (Germany).

KRAG-JORGENSEN. See RIFLE.

KRAKATOA, *krah kah toh' ah*, MOUNT. See JAVA.

KREFELD, *kra' felt*. See GERMANY (Principal Cities).

KREISLER, *kri' zluhr*, FRITZ (1875-), an Austrian master of the violin, whom many competent critics judge to be the greatest living player of that instrument. He was born in Vienna, and in the conservatory of that city won the first prize and a gold medal when only ten years old. Two years later, the Paris Conservatory awarded him the coveted First Prize of Rome (Premier Prix de Rome). Subsequently, after touring America with the pianist Moritz Rosenthal, Kreisler completed his education in Vienna and also served a year in the army. Since 1899 he has made regular tours of all civilized countries, and is admired by musicians and by the public alike. He fought in the Austrian army early in the World War, and was wounded. Having been granted a leave of absence, he resumed his concert tours, but canceled all American engagements during 1918 because of intense war feeling; these were later resumed.

In perfection of technique, in artistry of interpretation, and in breadth and thoroughness of musical knowledge, Kreisler is one of the greatest violinists of all time. He is the author of *Four Weeks in the Trenches—the War Story of a Violinist*.

KREMLIN, from the Russian word *kremli*, meaning *fortress*, is a name descriptive of the citadel of a Russian city. The best-known citadel of this class is the Kremlin of Moscow, which consists of a triangular enclosure about one and one-half miles in circuit and fortified by walls which are surmounted by cylindrical and square towers. The present walls have existed since 1492. The Kremlin contains the old imperial palace, several imposing cathedrals, a monastery, convent, arsenal, and the Great Bell of Moscow. This bell, which was cast in 1733, measures sixty feet in circumference and weighs nearly 200 tons (see BELL). The larger part of the great palace dates only from the middle of the nineteenth

century, for the edifices which preceded it were burned by order of the Russians on the occasion of Napoleon's invasion of Russia, in 1812. The red staircase, belonging to the banquet hall of the palace, was used only for state functions, and is associated with many historic scenes during the reigns of Ivan the Terrible and Peter the Great. During the Bolshevik revolution in 1917, the Kremlin was the stronghold of the Cadets, who were forced to surrender it to the revolutionists. The present government uses the Kremlin as an office building. See RUSSIA (History).

KRIEMHILD, *kreem' hilt*. See NIBELUNGEN-LIED.

KRIM, ABD-EL. See MOROCCO; RIFF, THE.

KRISHNA, one of the reincarnations of Vishnu, a Hindu deity. See VISHNU.

KRONSTADT, *krone' shtakt*. See RUSSIA (Principal Cities).

KRONSTADT CANAL. See CANAL (Canals of Europe).

KROPOTKIN, OR **KRAPOTKIN**, *kro pawt'-keen*, PETER ALEXEYEVITCH, PRINCE (1842-1921), a Russian Nihilist and geographer. He made

a permanent contribution to science by his publication, in 1873, of a map and paper showing that the maps of Asia then in circulation gave an entirely incorrect representation of the physical character of the continent. His discoveries were the result of explorations undertaken in 1864. The Russian Geographical Society sent him on an important expedition to Finland and Sweden in 1871. By this time Kropotkin had become deeply interested in the principles of the Russian Nihilists (which see), and thenceforth devoted himself to their cause. His activities led to his imprisonment, but he escaped within two years, and presently began to edit a revolutionary organ, *Le Révolte*,

in Switzerland. After 1886 he made his home in England, where he gave all of his time to writing and lecturing in behalf of communism. Kropotkin returned to Russia in June, 1917, after the revolution had deposed the czar, and died near Moscow about four years later.

Writings. His publications include *Terror in Russia*, *Memoirs of a Revolutionist*, and *Ideals and Realities in Russian Literature*.



Photo: Keystone

WHERE EVERY MAN REMOVES HIS HAT

The Saviour's Gate (the Spaskuja), one of the five gates of the Kremlin. The Gothic tower is 203 feet high, and was added in 1623 by an English architect named Holloway. A sacred picture of the Saviour (the "Palladium of Moscow") was placed upon the gate in 1647, and all who pass through must uncover.

Brought up in the strict puritanical faith of the Dutch Reformed Church, he also grew up with the conviction that he was the especial recipient of Divine favor, and this idea colored his later actions, which at times were open to criticism, but which represented his honest belief in his destiny.

Kruger's family helped to establish the Transvaal state, and under the new government the young man advanced steadily through the ranks of assistant field cornet, cornet, and commandant. He engaged in various expeditions against the native tribes, made hunting expeditions as far north as the Zambezi, and took an active part in the factional quarrels

KRUGER, *krOO' gur*, STEPHANUS JOHANNES PAULUS (1825-1904), a South African soldier and statesman, who reached the summit of his career as President of the South African Republic, being elected successively in 1883, 1888, 1893, and 1898. President Kruger, although only a plain, uneducated citizen of the wilderness, attained remarkable success as a military leader and a diplomat. He was born near Colesberg, in Cape Colony. When he was a lad of ten, his father and mother joined the Great Trek to the territories northward, and throughout his early years, he had first-hand knowledge of the adventurous life of the border country.

that disturbed the Transvaal for years after Great Britain acknowledged its independence, in 1852. In 1864 he was elected commandant general of the Transvaal forces, under the leadership of Pretorius, first President of the South African Republic. Kruger supported Pretorius, but was bitterly opposed to the latter's successor, Thomas F. Burgers; and his obstructionist policy, as leader of the opposition, led, eventually, to the annexation of the new state by the British, in 1877.

Kruger was just as active in opposition to the British government, and in 1880, when the Boer rebellion broke out, he headed the triumvirate (himself, Pretorius, and General Joubert) that directed affairs for the Boers and negotiated the terms of peace that were signed in 1881. Kruger had now become the leading figure in the Transvaal, and was elected its President in 1883. He personally secured British recognition of its independence, in 1884, under the name South African Republic, and for fifteen years he determined its policies. "Oom [Uncle] Paul," as Kruger was called, was held in high esteem, and his words were accepted as proverbs in the Transvaal. When he was warned against Jameson, instigator of the famous Jameson Raid through the Transvaal, in 1895, he answered the people by referring to the tortoise—"We must wait until the beast has stretched his neck well out of his shell, then we can cut it off."

The South African Republic was then entering upon a critical period, for Kruger's anti-British policy brought him into constant friction with the English government and the "Uitlanders," as the British residents were called. War finally broke out in 1899. When the British advanced toward Pretoria, in 1900, Kruger moved his headquarters eastward and crossed into the Portuguese possessions in September. A month later, he sailed for Europe, hoping to enlist aid for his cause. Unsuccessful, he made his home at The Hague until his death; his body was afterward taken to Pretoria for burial.

Related Subjects. The reader is referred in these volumes to the following articles:

Jameson, Leander Starr
South African War

Union of South Africa
Zambezi

KRUPP, *kruh'p*, FRIEDRICH ALFRED (1854-1902), the third of the famous German manu-



Photo: Brown Bros.

"OOM PAUL" KRUGER

facturers of steel whose great Krupp works, at Essen, Prussia, became known the world over. The founder of the business, FRIEDRICH KRUPP (1787-1826), was the grandfather of Friedrich Alfred. The latter's father, ALFRED KRUPP (1812-1887), was a brilliant metallurgist and inventor, and his breech-loading rifle and other guns helped the Germans defeat the French in the Franco-German War (1870-1871). Friedrich Alfred, who was born in Essen, inherited the factories on his father's death, in 1887, and enormously expanded the business. Branches of the works were established at Annen, Kiel, Gruson, and Magdeburg; the number of persons employed reached 43,000, and the Krupp works became the largest in the world for the manufacture of the great guns used in war. At the time of his death, Friedrich Alfred Krupp was the wealthiest man in Germany. He was generous with his employees, building modern dwellings and providing a pension fund of \$4,000,000 for their use.

Krupp's eldest daughter, Bertha, who succeeded to the business and took a personal interest in its management, was married to Dr. Gustav von Bohlen in October, 1906. On that occasion, Dr. von Bohlen was granted the privilege of bearing the name Krupp von



Photos: U & U

THE KRUPP HEIRESS

The former Miss Bertha Krupp and her husband, Dr. Krupp von Bohlen.

Bohlen. The Krupp works were the mainstay of the German demand for artillery during the World War, and the big guns were called "Big Berthas," in honor of the daughter. After the war, the factories were converted into plants for the manufacture of locomotives, agricultural machinery, and other industrial steel products.

KRYLOV, *kre lofe'*, IVAN. See RUSSIAN LITERATURE.

KRYPTON, *krip' tun*. See CHEMISTRY (The Elements).

KUBAN RIVER. See CAUCASIA (Caucasus Mountains).

KUBELIK, *koo' beh lik*, JAN (1880-), a Bohemian violinist whose remarkable technique and impressive individuality place him among the most gifted artists of the twentieth century. He was born in Miehle, near Prague, and received his early musical education from his father, making his first public appearance at the age of eight. For six years he was a student at the Prague Conservatory, and since that time has been appearing in public concerts in Europe and America.

KUBLAI KHAN, *koo' bli khan* (1216-1294), grand khan or ruler of the Mongols and the grandson of Genghis Khan, who founded the Mongol dynasty in China. Kublai Khan became grand khan upon the death of his brother Mangu, in 1259, while the latter was engaged in the conquest of China. This task was completed by Kublai, who assumed the rule of the conquered territory and nineteen years later added to it Southern China. His empire thus included a large part of Asia and those parts of Europe which had belonged to Genghis Khan. Kublai Khan was a wise administrator and the patron of letters and various branches of industry. Marco Polo, the Venetian traveler, spent several years at Kublai's court, and recorded some interesting information regarding him. See GENGHIS KHAN; MONGOLS.

KUBU TRIBE. See SUMATRA.

KUDU, *koo' doo*, a variant of *koodoo* (which see).

KUEN-LUN, *kwen loon'*, **MOUNTAINS**, a vast mountain system of Central Asia, extending for over 2,000 miles from the Pamir highland region in the west to the interior of China. One range of the system forms the northern boundary of the plateau of Tibet. The peaks in the western section, which form a single chain, and whose slopes carry great fields of snow and enormous glaciers, tower 20,000 feet above the sea. East of the eighty-fifth meridian (east longitude), the system is broken up into numerous ranges, plateaus, and valleys. The mountains are occasionally crossed by lofty passes over three miles in altitude.

KU-KLUX KLAN, a society founded in Pulaski, Tenn., about the year 1866, originally for amusement. The name first suggested was "Kukloi," from a Greek word, *kyklos*, meaning *circle*. It was changed to Ku-Klux, and Klan was added from the name of a former similar society.

In the reconstruction period, immediately after the War of Secession, the Ku-Klux Klan changed from a social organization to one which endeavored to hold the emancipated negroes in check. The Klan dressed in fantastic, ghostly costumes, with white masks; the members communicated with each other by means of whistles, and they rode out at night. All these facts reduced the supersti-

tious negroes to a state of abject terror. Although the organization exceeded legal bounds, it did much in bringing law and order to the South. After the war, the negroes were at first unruly, and later were an actual menace to the whites. In 1871 the government, alarmed at the ever-growing power of the Klan, gave the matter serious consideration and finally disbanded the organization. See RECONSTRUCTION.

In 1916 a new Ku-Klux Klan, patterned largely after the old society, was organized in Atlanta, Ga., and in a few years secured a large national membership. On the theory, widely accepted, that it aimed at white supremacy, was anti-Catholic and anti-Jewish, and therefore inimical to political justice and religious freedom, it was violently opposed, and its operations were given wide publicity. In 1928 the official name of the organization was changed to Knights of the Great Forest.

KUMASI, *koo mas' ie*, capital of Ashanti. See GOLD COAST.

KUMISS, *koo' mis*, a variant of *koumiss* (which see).

KUMQUAT, *kum' kwot*, a small, shrubby form of the orange tree, seldom exceeding six feet in height. It is a native of China, is extensively cultivated in Japan, and has been introduced into Florida, the Gulf coast, and California. Florida produces the greater part of the American crop. The kumquat withstands the effect of frost better than any other variety of orange, and under careful cultivation the tree may grow to heights of eight to twelve feet. The fruit is oblong, a little larger than the Brazil nut, and is palatable and refreshing. It is made into preserves, marmalade, and jelly, and is eaten fresh. Both flesh and rind are edible. B.M.D.

Scientific Name. The botanical name of the kumquat is *Citrus japonica*.

KUN, BELA (1886-). See HUNGARY (History).

KUNDRY, *koon' drie*. See PARSIFAL.

KUPREANOFF, an island off the coast of Alaska (which see).

KUPRIN, ALEXANDER. See RUSSIAN LITERATURE.

KURA, *koo' rah*, **RIVER**, a stream flowing into the Caspian Sea (which see).

KURDISTAN, *koor dis tahn'*, the Persian name for "the land of the Kurds," is applied to an extensive region of Western Asia, divided among Turkey, Iraq, and Persia, and covering an indefinite area of about 56,000 square miles. Kurdistan is a land of numerous and lofty mountains, but the ranges decrease in altitude beyond the Persian frontier. This region lies in the basins of the Tigris and Euphrates rivers and is watered by the Greater and the Lesser Zab. Cereals and southern fruits are the main

agricultural products. The inhabitants are chiefly Kurds, a rugged people of Mohammedan faith, related to the Persians in race and language. The wealthier Kurds are an independent, roving class who live in tents and are skilled breeders of cattle, horses, sheep, and goats. Among them are fierce tribal chiefs who have often been the terror of their Armenian neighbors to the north.

The chief cities of Turkish Kurdistan are Bitlis, Van, and Diarbekir; of the Persian area, Kirmanshah and Irak-Ajemi; of the section assigned to Iraq, Erbil, Kirkuk, and Sulaimaniya.

Though the Kurds were not concerned with the issues of the World War, they were seriously involved, together with Armenia on the north, and suffered terrible losses. At the close of the war, the remaining population, estimated at 1,500,000, sought independence from Turkey, but the question was deferred to be solved by the Council of the League of Nations. In the meantime (1925), a Kurdish uprising occurred in the cause of independence, which the Turks quickly quelled and severely punished by the execution of the ringleaders. The future of the Kurdish race as a community is in doubt. The division of their land among three powers will retard, if it does not prevent, their development as an independent nation.

KURILE, *koo' ril*, ISLANDS, about thirty-two volcanic islands in the Northern Pacific Ocean, lying in a chain between Kamchatka



LOCATION MAP

and Yezo. Japan obtained them from Russia in 1875 in exchange for the northern half of Sakhalin. The Kuriles have an area of about 6,153 square miles. Most of the peaks are forest-covered, and the chief exports are timber, fish, and fur. The principal islands are Itorup, Kunashiri, Paramushiri, and Shumshu.

The population is about 3,000. The Japanese name for the chain is *Chishima*, or *Thousand Islands*, and the original inhabitants were Ainos. See AINO. (See map, under ASIA.)

KUROPATKIN, *koo ro pah't' kin*, ALEXEI NIKOLAYEVITCH (1848-1921), a Russian general who served his country faithfully for half a century. Kuropatkin entered the army at the age of sixteen, bore a conspicuous part in the Russo-Turkish wars, became lieutenant in 1890, and Minister of War in 1898. When Russia and Japan began hostilities in 1904, he was given supreme command of the armies of the czar. After the great defeat at Mukden and the retreat of the troops to Tieling, he was succeeded as commander in chief by General Linievitch, taking the latter's place at the head of the first army in Manchuria.



Photo: Brown Bros.

KUROPATKIN

In his story of the Russo-Japanese War, entitled *The Russian Army and the Japanese War*, Kuropatkin paid high tribute to the soldiers who had gone into the fray under conditions which pointed to sure defeat, and he likewise frankly acknowledged his own mistakes. Nine years after the close of the war with Japan, his country entered the World War, on the allied side, and in 1916 he took command of the Northern Division, operating against General von Hindenburg. See RUSSO-JAPANESE WAR.

KURO SIWO, *koo' ro she' wo*, the native name of the Japan Current, in the West Pacific. See JAPAN CURRENT; OCEAN (Ocean Currents).

KUSKOKWIM, *kus' ko kwim*, RIVER, the second largest river in Alaska, exceeded only by the Yukon in length and in importance. Beginning in the Alaska Range, it takes a general southwestern course, and at one point flows not more than fifty miles south of the Yukon. For about 700 miles it winds its way across the southwest, watering an area of some 50,000 square miles. Mining districts are rapidly developing in the whole Kuskokwim region, which is mountainous except along the river's course, and the stream is therefore rapidly increasing in importance as a means of transportation. For small vessels the river is navigable for more than 400 miles. Bethel, about 100 miles from the head of Kuskokwim Bay, is connected by steamer with the Aleutian

Islands, a distance of 523 miles, and with Seattle, nearly 2,900 miles southeast of the Aleutians. It is along the Kuskokwim Valley that reindeer have been introduced in largest numbers. In time the government system of railways will connect the headwaters of the river with the Southern Alaska ports.

KUTA RIVER. See **LENA RIVER**.

KUTENAI, *koo' te nay*, OR **KOOTENAY**, **INDIANS.** See **INDIANS**, **AMERICAN** (Most Important Tribes).

KVALÖ ISLAND. See **NORWAY** (The Cities: Hammerfest).

KWANG CHAU-WAN, *kwang' cho wahn'*. See **FRENCH INDO-CHINA**.

KYANITE, *ki' a nite*, OR **CYANITE**, *si' a nite*, also called **DISTHENE**, is a pale-blue or white-and-blue mineral, found in rocks which divide along parallel planes. It is composed principally of aluminum silicate. The better grades are clear or translucent; the stone is capable of taking a high polish and is therefore used for ornaments. The principal sources are Massachusetts, Connecticut, Pennsylvania, North Carolina, Switzerland, the Tyrol, and Bohemia. Kyanite is commonly associated with garnet.

T.B.J.

KYNE, *kine*, **PETER BERNARD** (1880-), an American writer of realistic fiction, whose books have attained great popularity. He was born in San Francisco and educated in public schools and in business college. Before

he saw his first book published, in 1913, Kyne had a varied career as clerk in a general store and in lumber and shipping offices. As a lumber broker, he gained the experience that furnished the background for his successful stories of "Cappy Ricks," retired shipowner and lumber magnate. He also had some experience as a newspaper man, and is a veteran of the Spanish-American War, the Philippine Rebellion, and the World War. In the latter, he served as captain of the 144th Field Artillery.

His Writings. A keen imagination, spirited style, and ability to present his stories with vivid realism have won Kyne a wide circle of admirers. Among his stories are *Three Godfathers*, *The Long Chance*, *Cappy Ricks*, *The Valley of the Giants*, *Kindred of the Dust*, *The Pride of Palomar*, *The Go-Getter*, *Never the Twain Shall Meet*, *The Understanding Heart*, *They Also Serve*, *Tide of Empire*, *Jim the Conqueror*, and *Golden Dawn*. Several of these stories were adapted for the moving-picture screen.

KYOTO, *kyo' toh*, a Japanese seaport. See **JAPAN** (The Cities).

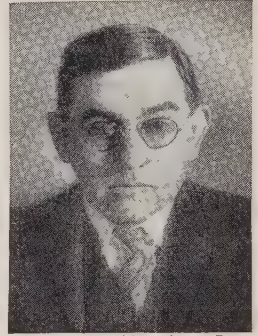


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PETER B. KYNE

THE WORLD BOOK

MODERN

ENCYCLOPEDIA

PICTORIAL

COMPREHENSIVE

L

L, the twelfth letter of the English alphabet, was derived through the Greek and Roman from the Phoenician *lamed*. The Phoenician letter resembled a capital *L*, though the angle formed by the two lines was considerably less than a right angle; the word *lamed* is supposed to have meant

L

oxgoad, and the letter is assumed to have been a picture of a whip with a lash. The Greeks changed the form of the letter so that it resembled an inverted *V*, but the Romans wrote it practically as capital *L* is made to-day. In sound, too, the letter has always been what it is at present, a liquid, or semivowel. It is very closely related to *r*, and the two are often substituted for each other in allied languages.

English has examples of words in which the *r* sound is given to *l*, as the first *l* in *colonel*. Many savages, it is said, cannot distinguish the two sounds, and it was very difficult at first to find out whether the capital of the Hawaiian Islands was *Honolulu* or *Honoruru*, as the natives used the two indiscriminately, seeming to perceive no difference in sound. *L* in English is sometimes silent, as in *palm*; but it serves in such instances to modify the sound of the vowel which precedes it. For the use of *l* in French and Spanish, see PRONUNCIATION OF FOREIGN NAMES.

LABAN, *la' ban*. See RACHEL; JACOB.

LABIATAE, *lay bik a' te*, botanical name of the mint family. See MINT.

LA BOHÈME, *lah bo aym'*. See OPERA (Some of the Famous Operas).

LABOR, DEPARTMENT OF, the tenth executive department of the United States government, established March 4, 1913, "to develop the welfare of wage-earners of the United States, to improve their working conditions, and to advance their opportunities for profitable employment." This department came into existence on the day that Woodrow Wilson became President of the United States; President Taft signed the bill creating it, as the last official act of his administration.

In the organization of the Department of Labor, a number of bureaus and divisions of what had been the Department of Commerce and Labor were transferred to it. These were the Bureau of Immigration, the Bureau of Naturalization, the Division of Information, Immigration Service at Large, and Bureau of Labor. The designation of the last-named was then changed to Bureau of Labor Statistics. There was also added the Children's Bureau, a new division which had been organized in 1912

under the old Department of Commerce and Labor.

The head of the department, the Secretary of Labor, is given power to act as mediator and to appoint commissioners of conciliation in labor disputes, wherever in his judgment the interests of industrial peace may require it.

The Bureau of Labor Statistics is charged with collecting and reporting, at least once a year, full and complete statistics of the conditions of labor and of the products and distribution of the products of labor; such parts of the information thus secured as the Secretary may deem proper may be given to the public. This publicity is usually accomplished in a series of annual reports.

The Secretary is a member of the President's Cabinet, but is not eligible to succession to the Presidency. His salary is \$15,000 per year.

Related Subjects. The reader is referred in these volumes to the following articles:

Cabinet	Commerce, Department of
Children's Bureau	Presidential Succession Act

LABOR, DIVISION OF, the name given by political economists to the conditions which exist in modern industry under which one man performs only one function, or at most a few

functions, in a long series of operations. In the manufacture of shoes, for example, there are some eighty different processes; the old cobbler still cuts out the leather and builds up the entire shoe, piece by piece, but in the modern factory, where one man cuts soles, another cuts uppers, another the tongues, and so on, in nearly every step the workman is either helped by machinery or merely operates a machine. Again, in the manufacture of watches, there are several hundred processes. Each part is stamped out of metal by a machine which performs only one operation. The parts are sorted into trays or boxes and given to an adjuster, who assembles or puts the parts together. Formerly, the watchmaker was a craftsman; to-day he is chiefly a mechanic or an engineer. One of the great advantages of making all the parts of a watch by machinery is that each is standardized, so that a given part will fit any watch of the same modern make.

The division of labor is, as a matter of fact, the result of the development of the factory system and of the accompanying use of machinery (see **FACTORY AND FACTORY SYSTEM**). The arguments in its favor are easily understood. It divides a complicated process into a series of simple operations, in which the workman becomes skilful in a shorter time than if he had to learn all the other operations as well. This method means a saving of time, and therefore a saving of money and a reduction in the cost of production. Another great advantage is the inducement to invent new machinery and the tendency to use all machinery more efficiently.

While it is undoubtedly true from the point of view of the community that the division of labor means economy, it is equally true that it may harm the individual workman. It increases the latter's skill in one field, but it lessens his experience and usefulness as an all-round workman. The objection is frequently heard that the modern factory, with its minute division of labor, destroys the individuality of its workmen and makes machines of them. The movement usually called *Arts and Crafts* (which see) is chiefly a protest against this tendency, and is an attempt to restore individuality to the craftsman and his products. See **ECONOMICS**. E.J.

LABOR, HOURS OF. See **LABOR LEGISLATION**; **EIGHT-HOUR DAY**.

LABOR BANKS. See **BANKS AND BANKING**, subhead; **LABOR ORGANIZATIONS**.

LABOR DAY, a legal holiday, usually the first Monday of September, observed in nearly all the states of the American Union and in the provinces of Canada. In New Orleans it is celebrated on the fourth Saturday of November, and in North Carolina on the first Thursday of September. It is not in effect in Alaska,

the Philippines, or Porto Rico. The celebration of Labor Day on the first Monday of September was inaugurated by the Knights of Labor in 1882. Different organizations of workingmen then petitioned for legislation making the day a legal holiday; in 1887 Colorado passed the first law to that effect. The occasion is marked by cessation from usual labor, and in many localities by parades, meetings, and addresses by prominent labor leaders.

Since the Labor Congress in Berlin, in 1890, the first of May has been set aside for labor demonstrations in some European countries.

LABOR LEGISLATION. By this term is meant the body of law that regulates the conditions under which manual laborers work. Every historical period has had its characteristic type of labor legislation, from the primitive regulations of slavery to the modern law of employer and employee. However, since the laws that grew up during the nineteenth century in response to the Industrial Revolution are different in scope and purpose from the legislation of earlier times, we do not need to go back further than 1800 for the beginning of modern labor law.

Labor Legislation in England. England was the first country to feel the effects of the Industrial Revolution, and it was in England that modern labor legislation began. Starting about the middle of the eighteenth century, the Industrial Revolution in a few years altered the structure of English society. Chief among the vast changes that took place was the creation of a large self-conscious working class. Previous to this time, the wage-earner had been a minor element in society. A majority of the working class during the handicraft period that preceded the Industrial Revolution consisted of small proprietors or journeymen who sold their services and their products on a plane of equality with the purchaser.

The introduction of machinery, with its cheap and productive methods of supplying goods, eliminated the handicraft-worker. He became a wage-earner, and, whereas in the handicraft stage he had exercised some degree of control over his bargains with the consumers of his product, he now had nothing to bargain with except his labor, which had to be disposed of on any terms if he were to secure the means of sustaining life.

Not only did the introduction of machinery result in a new method of production, but it also ushered in a new system of economics. In contrast to the old idea of production for use, the new idea was production solely for profit. The first consideration of the factory-owner was to dispose of his product at a profit; the welfare of his workers was secondary. It was just at this time that the economists pointed out that there was a definite fund

from which wages were paid, and that the higher wages were, the lower profits would be.

This early industrial development took place during a period of individualism. It was generally believed that the new factory-owners, if left to their own devices, would be compelled by economic law to give the worker his just deserts. But wages fell, large numbers of women and children were pressed into service, and the rising industrial communities were unsanitary and unwholesome.

Public opinion was aroused by the exploitation of women and children. Led by such men as Sir Robert Peel, Robert Owen, and the Earl of Shaftesbury, there was a demand that the government interfere, in order to protect the worker from the new hazards of industry that were making the introduction of machinery a doubtful blessing.

The first factory act was passed in 1802. It prohibited the binding out of pauper children under nine years of age to cotton factories, restricted their hours of labor to twelve a day, and forbade night work. In 1819 this law was extended to children who were not paupers. A law in 1833 applying to textile mills prohibited the employment of all children under nine years of age, limited the hours of labor of children between nine and thirteen to eight hours a day, and those between thirteen and eighteen to twelve hours. In 1844 the hours of women workers in factories were limited to twelve a day, and night work was prohibited. This law was followed in 1847 by the limitation of the hours of women and young persons in factories to ten a day.

In addition to assuring protection of women and children from excessive hours of labor, Parliament legislated to protect the whole industrial population from dangerous and unsanitary surroundings in factories. In 1878 the Factory and Workshop Consolidation Act repealed all former factory laws and substituted a codification of the labor laws that had been passed up to that date.

In 1871 and 1875, Parliament provided that membership in a trade union should no longer be regarded as a criminal conspiracy. In 1906 and 1913, trade-unionism was further strengthened by acts of Parliament which exempted unions from damage suits for acts committed in the course of a trade dispute, and gave them freedom to use their funds for political purposes.

In addition to laws designed to prevent exploitation of laborers and to safeguard their organizations, Parliament has legislated to protect workers from the major hazards of industry. In 1897 a workmen's-compensation act was passed, remedying the previous unsatisfactory state of the law. In 1908 a system of old-age pensions was established. A minimum wage for employees in certain industries

was made obligatory by Parliament in 1909, and since then many other industries have been brought within the scope of the act. Unemployment insurance and health insurance were initiated in 1911. The latest form of compulsory insurance for the protection of working people was the widows' and orphans' insurance law, passed in 1926.

Elsewhere in Europe. Other European countries likewise found it necessary to legislate for the protection of working people when modern industrial methods succeeded the older economy. Germany has had a notable experience with social legislation which began with Bismarck's efforts in the eighties to offset socialism with benevolent despotism. In fact, Germany has been the experimental ground for the leading types of social legislation. Health insurance, workmen's-compensation insurance, and old-age and invalidity insurance made their initial appearance in Germany in the eighties, and later spread throughout the world.

Shortly after the World War, a comprehensive system of workers' representation in industry, through the instrumentality of shops councils, was established by law. An unemployment-insurance law also went into effect.

Russia and Italy since the war have worked out complete systems of labor legislation, while outside of Europe, Canada and Australasia have been most active. In Australasia, strikes are prohibited by law, and courts have been established with jurisdiction over labor disputes.

Labor Legislation in the United States. The development of labor legislation in the United States has differed from European experience because of the later industrialization of the country, the abundance of resources, and the absence of a class-conscious feeling among American workers. Another marked difference is the part the courts play in American labor legislation. The peculiar American doctrine of judicial review of legislative enactments gives the judiciary the final decision as to whether or not any enactment regulating the conditions of labor shall become a law. The Fifth and Fourteenth amendments to the Federal Constitution prohibit the national and state governments from depriving any person of life, liberty, or property without due process of law, and it is left to the courts to determine what constitutes due process of law in any particular case.

American labor legislation has had to overcome a strong judicial presumption that it takes away liberty and property without due process of law. Most of the courts have visualized employer and employee as equals in bargaining power, and they have been reluctant to permit the legislatures to favor the laboring man with laws which restrict an employer's use of his property.

While the courts have balanced the right of the laborer against the right of the employer, the legislatures have recognized the emptiness of this procedure, and have passed laws to assist the worker, on the theory that there is no equality between the individual worker and the vast impersonal corporation which is, as a rule, his employer to-day. The absence of equality in the bargaining process opens the way to exploitation which the worker is not able to combat alone. So it becomes the duty of the government as the protector of social welfare to prevent the standard of the working population from dropping below a socially desirable point.

The state legislatures have built up, principally during the first quarter of this century, a wide body of social legislation, through the exercise of the police power. This is the power of the state to legislate for the health, morals, and general welfare of the community. The police power, however, must not go beyond the limits of due process of law, and, as has been pointed out, these limits are laid down by the courts. The Federal government has no police power, but it has been able to regulate labor relations that come within the scope of its constitutionally delegated powers.

The first outstanding decision on labor legislation by the United States Supreme Court was in the case of *Holden vs. Hardy*, in 1898. In this case it was held that a law passed by the Utah legislature limiting the hours of labor in mines to eight a day was a legitimate exercise of the police power. Such a law did not deprive the mine-owners or the workers of their property without due process of law.

In 1905 the court in *Lochner vs. New York* held that a law which limited the hours of work in bakeries to ten a day violated the Fourteenth Amendment by depriving the parties concerned of their liberty and property without due process of law. Other hour laws have fared better at the hands of the Supreme Court. In 1903, in *Atkin vs. Kansas*, the court approved the Kansas law which established the eight-hour day in public employments, both for direct and for contract work. The decision in *Bunting vs. Oregon*, in 1917, upheld the Oregon law establishing a maximum ten-hour law for all employees engaged in manufacturing enterprises in the state. The Adamson Act, passed by Congress in 1916 to establish the eight-hour day on the railroads, was upheld by the Supreme Court. On the other hand, the court has disapproved of the efforts of the Federal government to abolish child labor through the instrumentality of the Federal power to regulate commerce and to tax. In the case of *Adkins vs. Children's Hospital*, in 1923, the Supreme Court overthrew the minimum-wage law of the District of Columbia on the ground that it interfered with the

freedom of contract. In 1923, also, the compulsory-arbitration law of Kansas was declared to be unconstitutional.

The cases cited here are only samples of the constantly increasing number of judicial decisions that are called for by the growing body of labor legislation in the United States.

It is evident that in some cases the courts have permitted laws to stand despite the fact that they are a restriction on the use of property and the exercise of liberty, while in other cases the courts have held that such restrictions violate the constitutional requirement of due process of law. However, despite adverse decisions in many important cases on labor legislation, the state and Federal lawmaking bodies have built up a complex body of law regulating labor conditions.

In all states the hours of children in factories are regulated. All but five states lay down a maximum number of hours that women may work in factories. In three states the hours of all persons engaged in manufacturing are limited. Many states regulate the time and place of payment of wages, and also the basis and medium of payment. The physical surroundings of workers while they are at work are safeguarded in all states. All but five states have workmen's-compensation acts, and several have adopted other forms of social insurance. One state, Wisconsin, has considered the possibility of an unemployment-insurance law, but the bill failed to pass. A majority of the states have legislation providing for the voluntary settlement of industrial disputes.

The Federal government has been active within the scope of its powers in passing labor laws, the most important of which are concerned with labor relations in interstate commerce. Federal legislation on mediation and arbitration in railroad labor disputes began in 1888. The latest law on the subject was passed in 1926.

In 1913 the Department of Labor was created by Congress. This department administers the immigration laws, gathers and publishes labor statistics, and offers conciliation in case of labor disputes anywhere in the United States.

To satisfy the demands of organized labor for relief from the anti-trust laws, Congress included in the Clayton Act, passed in 1914, a clause which provided that the anti-trust laws should not be construed to forbid the existence of labor organizations or to restrain members from carrying out the legitimate objects of their unions. Labor has found that this clause has not brought the desired relief, and at present there is a strong movement on foot for further Federal legislation. J.R.C.

Related Subjects. The reader is referred in these volumes to the following articles:

Arbitration

Eight-Hour Day

Employers' Liability
Labor Organizations

Mothers' Pensions
Old-Age Pensions

LABOR ORGANIZATIONS, societies whose purpose is to improve the situation of laboring men and women, especially by securing increased wages, shorter hours of work, and better working conditions. They are broadly of two kinds—the *trade-unions*, whose members all have the same occupation, and the *associations*, which admit workers of every sort.

When the first unions were formed in England, in the eighteenth century, factory laborers—men, women, and even small children—were working more than twelve hours a day in dark, unsanitary shops, for wages scarcely sufficient to keep them alive. Every workman was almost absolutely dependent upon his employer, but the latter could easily do without any individual employee. At first, unions were prohibited by law, and the members were obliged to act in secret; but they soon made themselves feared, if not respected, by their employers, who were unable to treat an organized body of men as they had treated individuals. Powerful unions arose in nearly all the civilized countries, and, largely as a result of their efforts, the conditions of labor have been revolutionized. The article EIGHT-HOUR DAY explains one of the reforms obtained.

A frequent criticism of trade-unions is that they have become as arbitrary on their part as they claim many of the employers to be. Thus they not only oppose the hiring of non-union labor, but one trade strictly confines another trade to the latter's own business. For example, a bricklayer is forbidden to drive a nail, and a carpenter must not handle a trowel. The Knights of Labor, which, for awhile about 1885, was the strongest labor organization in America, is said to have declined in power because of its opposition to the unions, and leadership is now held by the American Federation of Labor, an association formed by 106 International and National unions in the United States and Canada. The total membership of the Federation is about 3,400,000.

The policy of all the unions in demanding an equal wage for all, regardless of their comparative ability, is sometimes objected to on the ground that it gives no encouragement to conscientious and skilful work. On the other hand, the receipt of good wages by comparatively inefficient workmen enables them so to improve their conditions of living that they and their children become more efficient than were any laborers under former wage systems. In many countries where uniformly high wages are paid, manufacturing is really cheaper than elsewhere, both because of the increased value of the men and because of the stimulus to inventing labor-saving devices.

In England, labor organizations became active after the law against them was repealed

in 1824. The trade-unions were responsible for many strikes accompanied by violence, and many workmen preferred to belong to socialistic societies. In 1864 the International Workingmen's Association was formed by French and British laboring men; it soon drifted into socialistic control, and eventually split into two rival societies. It opposed war and held the duty of a workman to his fellows to be above national allegiance. An international organization of to-day advocates the same principles, but proved to be powerless at the outbreak of the World War in 1914.

Workingmen's associations gained importance in the second quarter of the nineteenth century. The first large federation was the National Typographical Union, later called *International*, to include Canadian members. Since the decline of the Knights of Labor and the rise of the American Federation of Labor, the most important new organization has been the Industrial Workers of the World, familiarly called the "I.W.W.," a radical society objected to by the American Federation of Labor because it advocates sabotage.

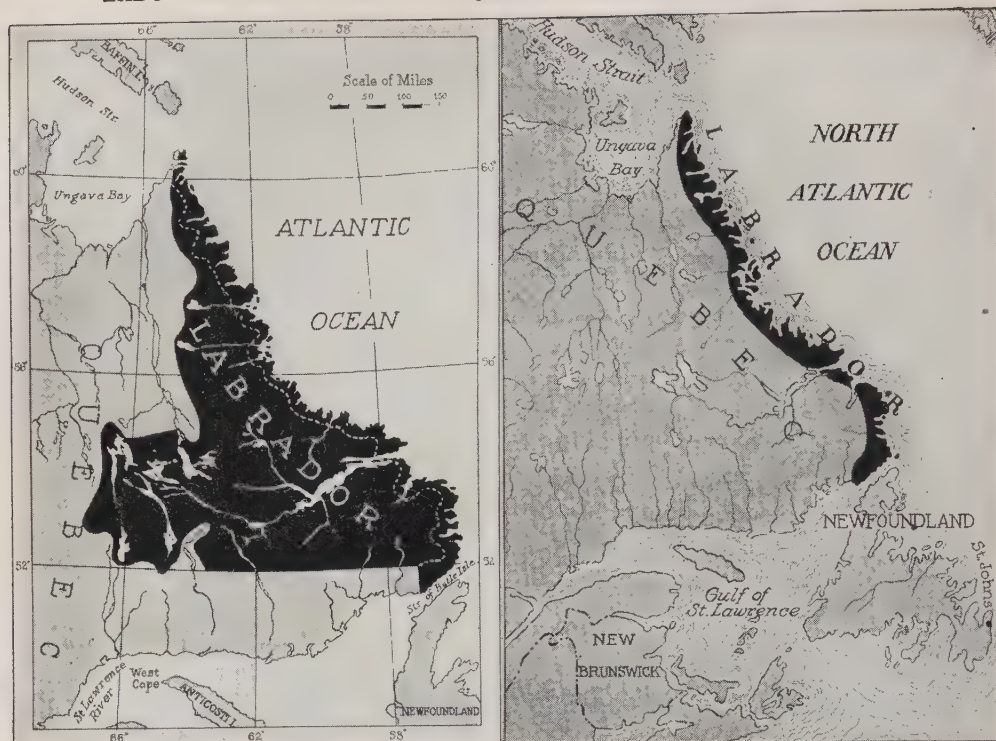
Labor Banks. A new phase in the history of American trade-unionism began in 1920 when the Mount Vernon Savings Bank was established at Washington, D. C., by the International Association of Machinists. This pioneer trade-union bank was followed in the fall of the same year by the Coöperative National Bank, opened at Cleveland by the Brotherhood of Locomotive Engineers. Within the next five years more than thirty additional labor-owned banks had been put into successful operation, with the result that a better understanding began to be developed between capital and labor. While labor has benefited from the profits of the banks, it has at the same time been taught the problems and risks of capital, and capital has acquired, also, a new viewpoint in its attitude toward labor.

J.R.C.

International Labor Organization. The treaty of peace which ended the World War, and which was signed at Versailles in 1919, included a section which provided for the establishment of the International Labor Organization. It is not a part of the League of Nations, but is organized under its own provisions in the treaty. The purpose of the organization is to improve labor legislation, maintain good industrial relations, prevent strikes, and promote efficient management.

The membership now consists of representatives of fifty-five nations. All members of the League of Nations are automatically members of the organization, but the latter also includes representatives of nations which are not members of the League.

The organization maintains permanent headquarters at Geneva, Switzerland, in its own



THE NEW AND THE OLD LABRADOR

At right, the old area, in black. At left, the enlarged territory.

building, the funds for which were donated by its member states. There are branch offices in London, Paris, Rome, Berlin, Tokyo, Delhi, and Washington, D. C.

Related Subjects. General articles and biographies of labor leaders having a bearing on this subject appear under the following titles:

Child Labor	Labor, Division of
Communism	Labor Day
Convict Labor	Labor Legislation
Debs, Eugene V.	MacDonald, James Ramsay
Eight-Hour Day	Minimum Wage
Factory and Factory System	Mitchell, John
Gompers, Samuel	Open Shop
Henderson, Arthur	Powderly, Terence V.
International, The	Sabotage
Knights of Labor	Strike
Labor, Department of	Syndicalism
	Wages

LABOR-SAVING BOOKS. See BOOKKEEPING (Special Forms).

LABOUR PARTY. See GREAT BRITAIN (History).

LABRADOR, *lab ra daw'r*. Sailors of the seventeenth century who followed the Cabots in explorations along the North Atlantic coast put their opinion of Labrador into words which became a geographical classic:

God made most of the world in five days, Labrador on the sixth, and spent the seventh day throwing stones at it.

For years the country was known as a place of "awful desolation." Although it was the first part of North America discovered by Europeans, having been visited by Norsemen in the tenth century, it is still comparatively unexplored. Thousands of fishermen from Newfoundland, Canada, and the United States carry away more than five million dollars' worth of fish from its coastal waters each year, but few white people had ventured into the interior until recently. Now men know that beneath the white wastes of greater Labrador lie fortunes in minerals; in its forests are millions of dollars in spruce for pulpwood; in its rushing falls and rivers is almost unlimited power.

Labrador is a dependency of the Dominion of Newfoundland. Lying east of the Canadian province of Quebec, it extends from the Strait of Belle Isle northwest to Cape Chidley, at the entrance of Hudson Strait. This narrow, icebound strip of rugged coastland which was Labrador, with an area of 120,000 square miles, was extended in 1927 by decision of the Privy Council in England; its western limits now reach to the Atlantic watershed. Within the new territory, which nearly doubles the original area by adding 112,400 square miles, are all of the rivers which flow from the high hills to the Atlantic. The addition resulted



Photo: U & U

LABRADOR DOES NOT PRESENT A PLEASING VIEW

This scene is at Indian Harbor, one of the principal settlements; the village is "civilization's farthest north" on the Atlantic coast.

from the settlement of an old dispute with Canada over Labrador's western boundary, and includes land formerly claimed by Quebec.

The People and Their Surroundings. There are only about 4,000 people in Labrador, and the population is concentrated in small, scattered settlements. In the barren north the people are chiefly Eskimos; in the south live Algonquian Indians, and here and there in the various settlements live a few whites. Only scattered Indian tribes roam the forests of the new western portion. Class spirit exists between the Indians of the south and the Eskimos of the north. Some of the homes of these fur-clad people are tents of skins or rude huts of stones or wood, often banked with snow and shaped like beehives. Although native dialects are still employed, English is generally spoken, and over one-third of the people belong to the Church of England. Many of the natives have been taught to read and write through the efforts of Moravian missionaries, who have numerous stations along the coast. The Indians of the south are principally Roman Catholic. Through the heroic work of Sir Wilfred Thomason Grenfell, medical aid and a brighter future have been brought to Labrador's poor fisherfolk.

As the climate of the country is exceedingly cold and stormy at all times, except during a short summer season, the country is not adapted to agriculture. Moss and lichens are

the principal forms of vegetation in the north; stunted growths of poplar, pine, birch, and willow are found in the south. Fronting the Atlantic, Labrador presents a wall of rocky cliffs from 1,000 to 6,000 feet high, which are cut into numerous bays and fiords matching the Norway coast in beauty. The brilliant northern lights appear frequently.

Labrador streams are rich in excellent food fish, which, with the cod and salmon fisheries of the coast, furnish summer occupations resulting in great wealth to Newfoundland. Valuable fur-bearing animals abound, and the trapping of silver, red, and white foxes, marten, lynx, otter, mink, beaver, and bears is the principal winter occupation. Caribou of the interior and seals of the coast are the principal sources of animal food to the inhabitants. Dogs and reindeer are the only domesticated animals, and both are used to draw sledges, the sole means of land conveyance. Canoes traverse the waters for hundreds of miles. Eagles, hawks, white grouse, and numerous varieties of waterfowl are plentiful. Mosquitoes are as numerous and troublesome during their brief season in this land of almost continuous Arctic weather as in southern climates.

The interior of Labrador contains vast possibilities of wealth whose actual limits are still unknown. Large deposits of labradorite (a sort of feldspar) and of iron exist in both old and new Labrador; the discovery of gold

had much to do with the final settlement of the boundary dispute; and some copper deposits may be found. All of these mining industries must await transportation facilities before they can be developed.

The value of the 60,000 square miles of timber tracts in Labrador has been estimated at \$250,000,000; the greater part of this timber is spruce, which is used for the vast pulpwood industry.

Important in the development of both the mining and lumbering industries, as well as others whose possibilities remain unconsidered, is the wealth of water power. The available power at Great Falls, only one of the places where hydroelectric energy is going to waste, is more than 4,000,000 horse power, over three times the amount now developed in all of far Eastern Canada.

History and Government. In the tenth century, Leif, the Norseman, discovered the Labrador coast, but no explorations were made. It was again discovered in 1497 by John Cabot. Explorations and settlements were made, and the name Labrador was given to the entire peninsula, which is now almost entirely a part of Canada's province of Quebec. It is said that this peninsula was called Labrador because it was believed to be part of Greenland, which had been named Labrador from the Basque sailor Bradore who sighted it about 1520. Until 1840 the section was practically unexplored; then officers of the Hudson's Bay Company traversed the interior.

The coast strip which formerly constituted Labrador proper has changed ownership several times, and is now under the jurisdiction of the Newfoundland government. The exact boundaries were long disputed by Newfoundland and the Dominion of Canada. In 1923 Quebec definitely claimed the territory; the matter was referred to the London government for settlement. The difficulty lay largely in the interpretation of the word "coast," referring to the section which was declared by the Royal Proclamation of October, 1763, to be under "the care and inspection" of the governor of Newfoundland. Newfoundland contended that the coast carried with it the hinterland back to the crest of the watershed, just as the term "Pacific coast" indicates a coastal region. The Dominion of Canada, on the other hand, declared that the coast could have at the most only a depth of one mile inland from the high watermark on the seashore. The dispute was settled by the decision of the Privy Council of the Empire, from which there is no appeal, in March, 1927. Newfoundland was victor, and Labrador was extended westward to the watershed; in the southwest, land draining southward into the Gulf of Saint Lawrence was awarded to the province of Quebec. Canada, having lost in the decision, still seeks

to secure the territory from Newfoundland by purchase.

Related Subjects. The reader is referred in these volumes to the following articles:

Aurora Borealis	Indians, American (Indian
Cabot, John	Families and Tribes)
Canada	Labradorite
Eskimo	Newfoundland
Grenfell, Wilfred T.	Watershed

LABRADOR CURRENT, a cold ocean current, flowing from the Arctic Ocean along the shores of Labrador to a point near Newfound-



LABRADOR CURRENT

The downward-pointing arrows indicate the general course of the Labrador Current. The arrows pointing in a northeasterly direction show the course of the Gulf Stream.

land, where it meets the Gulf Stream. The influence of so considerable a body of icy water is felt as far south as New England. The harbors of Labrador are blocked with ice for about half of each year, whereas those of the British Isles, situated in the same latitude, are open to commerce throughout the year. The difference is largely one of ocean currents, Great Britain being warmer partly because of the influence of the Gulf Stream.

The Labrador Current is a considerable inconvenience to shipping. The cold current has a chilling effect on the air; it condenses the moisture and gives rise to the heavy fogs off the shores of Labrador and Newfoundland—fogs through which ships have to feel their way with great caution to avoid collisions with other craft or with icebergs. See **ICEBERGS**; **OCEAN** (Ocean Currents).

R.H.W.

LABRADORITE, *lab ra dawr' ite*, OR **LABRADOR SPAR**, so named from the region where it was discovered, is an ornamental variety of feldspar used for decorative purposes and to make fancy boxes, paper weights, clock panels, and other articles. Labradorite is

characteristically gray, but has a fine play of colors—blue, green, orange, purple, and red. A comparatively rare iridescent variety is used in inlaid work. Labradorite is found to some extent in Northern New York and Canada. See FELDSPAR.

T.B.J.

LABRADOR TEA, one of a genus of small evergreen plants belonging to the heath family, which grow in swamps in Greenland, Northern Europe, and the northern part of North America. The leaves are tough, with a woolly brown covering on the under side, and when bruised are very fragrant. They are dried and used as a substitute for tea in Labrador, as suggested by the popular name of the plants. As they have narcotic properties, they are sometimes used as a substitute for hops in the manufacture of beer. The leaves also contain tannin, and have been employed in leather manufacture.

G.M.S.

Scientific Name. The plants belong to the family *Ericaceae*. The botanical name of the most common species in the United States is *Ledum groenlandicum*.

LABURNUM, an ornamental tree prized on account of its bright-yellow blossoms and glossy foliage, which remains green until late in the fall. It is sometimes called *bean trefoil tree*, or *golden-chain*. All parts of the tree, particularly the seeds, are poisonous, and insects never molest it. The common laburnum sometimes grows to a height of forty feet, but averages about twenty feet. In the United States, it thrives as far north as Massachusetts. This tree has very fine-grained, hard wood, which can be polished. It is used for turning, cabinet work, inlaying, and other purposes. The poisonous substance contained in the seeds of the laburnum is called *cytisine*.

G.M.S.

Scientific Name. The common laburnum belongs to the pulse family, *Leguminosae*. Its botanical name is *Laburnum vulgare*.

LABYRINTH, *lab' ih rinth*. One of the best-known of all legends is the story of Theseus, who with six other Greek youths and seven maidens was sent into the Cretan labyrinth to face the terrible Minotaur. He killed the monster, but would have been unable to find his way out of the innumerable twisting passages of the labyrinth had not Ariadne given him a skein of thread to unwind as he entered. Until within the present generation, it has been supposed that the story was entirely fanciful, and that the idea of the labyrinth was suggested by a cave on the mountainside, near Cnossus, the ancient home of the Cretan kings. However, remarkable excavations have established the probability that the legend is founded on events which actually took place. At Cnossus has been uncovered a marvelous palace truly labyrinthic in its intricacies.

The great labyrinth of Egypt, which Herodotus considered more marvelous than the Pyra-

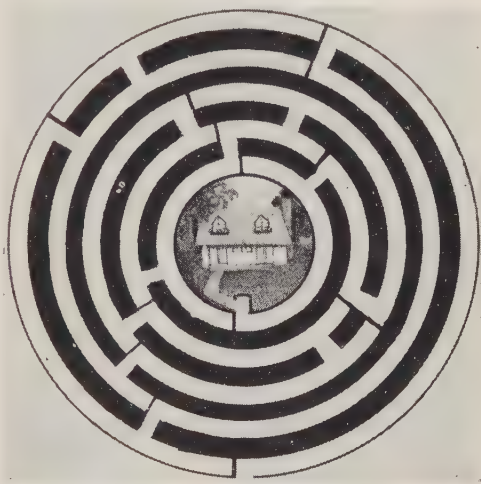
mids, was long ago torn to pieces, but its site can still be traced. It was perhaps built in emulation of the Cretan labyrinth.

The Modern Labyrinth. A structure with an ingenious and confusing network of passages is often seen in amusement parks. A modern labyrinth of this nature is usually called a *maze*; it is designed to furnish amusement to those who like to try their skill at finding their way through a series of complicated, winding pathways. Games for boys and girls, based on the same principle, are also popular.

Related Subjects. The reader is referred to the following articles in these volumes:

Ariadne
Crete

Minos
Minotaur



LABYRINTH, OR MAZE

A maze of the style once popular in English gardens. The walls were green hedges. By consistently following the right-hand or the left-hand wall a person could reach the center with comparative ease. A remarkable hedge maze still embellishes the gardens of Hampton Court, near London.

LABYRINTH, the internal ear. See EAR, subhead.

LAC, *lak*, a resinous gum from which shellac, a high grade of sealing wax, and lac dye are obtained. The resin is the secretion of several scale insects. In the countries where lac is produced, the natives hang the larvae (young) of the insects upon the twigs of fig and certain other trees. Spreading to all the tender branches, the insects pierce the bark to get their food. Through certain pores they give out a sticky substance by which they are fastened to the trees. Beneath the bodies imprisoned in this lac, the eggs of the mature insects hatch into countless other larvae. Several generations thus succeed each other in one season, sometimes depositing lac half an inch deep. After six months, the encrusted branches are cut off, and the lac is prepared for commerce. The trees are given a rest at intervals of three or four years.

In the form of stick lac and as gum, or seed lac, the product is crushed, washed, and boiled, or treated with wood alcohol. It is then melted and poured out thinly over a cold surface, a process that gives the brown, brittle flakes which are marketed as shellac. This substance, when dissolved in alcohol or other solvent, is valued for varnish because light penetrates it and shows the grain of the wood beneath. The best shellac is a light orange-brown; if all the impurities are not removed, it is darker. Pulling and twisting makes it opaque, suitable for sealing wax. From the coloring matter which is strained out of the insect bodies comes a beautiful purple dye, but, like other natural dyes, this is of minor importance because of the development of synthetic coloring matter.

Formerly, the lac industry was centered in Assam, Bengal, and Siam, but the Philippines, Argentina, Japan, and some other countries now produce the resin in sufficient quantities for export. See DYEING AND DYESTUFFS; VARNISH.

Derivation. *Lac* is derived from Persian and Hindu words meaning *hundred thousand*, with reference to the innumerable insects that produce the resin. In Europe and America the term *lacquer* may mean a coat of shellac, but in Eastern countries lacquer is the product of the varnish tree (see LACQUER WARE).

LACCADIVE, lak' a dive, ISLANDS, a group of fourteen islands and coral reefs in the Indian Ocean, near the southwestern extremity of India, eight of which are inhabited. They are politically attached to British India, and are populated by a Mohammedan race of mixed Arab and Hindu descent. The islands occupy an area of about eighty square miles, and lie so low in the sea that they would hardly be seen but for their coconut groves. The chief products are copra and coconut fiber. Rice, the principal food of the islanders, is imported. The women manufacture coir, from which matting is made (see COCONUT), while the men devote themselves to boat-building and trading with the mainland. The population is about 10,600; the language, largely Malayan.

LACE, a delicate network of fine threads, of which ornament and fabric are constituent parts. The word received its present application in the sixteenth century; previously, it was descriptive of the cord used to lace articles of clothing, and of gold and other fancy braids used for trimming. The most ancient specimens of lace in existence are the hair and breast nets found in Egyptian tombs, which date as far back as 2500 B.C. There are two distinct classes of handmade lace, each of which contains many varieties; these are *needle-point* lace, and *bobbin*, or *pillow*, lace. A great deal of lace is now made by machinery,

but this is usually not comparable to the exquisitely designed and delicately beautiful handmade varieties.

Collections of handmade lace are to be found in the Metropolitan Museum of Art, New York; the Victoria and Albert Museum, London; and in museums in many of the chief cities of the continent of Europe. These collections afford an opportunity to compare the various patterns and study their historical development.

Needle-Point Lace. In the *needle-point process*, a needle and a single thread are employed, and the work is developed mesh by mesh, each mesh being completed before the next is begun. Under this head are included Guipure, Venetian point, the French laces of Alençon and Argentan, Brussels Rose, Portuguese, and Maltese point. Brussels point differs from the Venetian and French needle laces chiefly in the use of a plain instead of a button-hole stitch. Spanish point was at one time very popular, but the industry declined owing to the large quantities of Flemish lace imported into Spain. Specimens of this lace produced by Spanish convents in the early part of the nineteenth century were similar to Venetian point. Point d'Angleterre is another name for Flemish lace. In the oldest forms of point lace, there was a foundation of fine linen, with a network of threads attached to a light frame, the patterns being worked with the button-hole stitch upon these threads and into the linen foundation. When the work was completed, the foundation was entirely hidden by the design. The foundation outside the pattern was then cut away, and the designs were joined together by threads.

The Bobbin, or Pillow, Process, a form of lace said to have been invented in 1561. This variety is made by working the design over a parchment pattern upon a cushion or pillow, the threads being wound upon bobbins. The figure is then made by looping the threads around the pins to form the openwork, or net part, of this form of lace. Among the more important bobbin laces are Brussels (both Saxony and Flemish), Mechlin, Lille, Chantilly, Valenciennes, Honiton, and Irish lace. The Mechlin laces are made in Mechlin, Antwerp, and Lierre. Ordinary Mechlin and Brussels pillow laces are made with a hexagonal mesh. The Lille laces are of a simple pattern, outlined by a thick thread. The Chantilly are also of simple construction, and are highly regarded, especially in black. Valenciennes is probably the most important pillow lace manufactured in Belgium, and that made at Ypres is of a particularly fine quality. Its chief characteristics are elegance of design; beauty of background, and uniformity of tissue. The mesh, diamond-shaped and closely plaited, is without twisted sides.



Photos: Metropolitan Museum of Art, New York

Delicate, Yet Enduring. The above are all Needlepoint. (1) Venetian, Rose. (2) Venetian, gros. (3) Argentan. (4) Alençon. (5) Brussels. (6) Spanish. (7) Maltese.



Photos: Metropolitan Museum of Art, New York

Nearly of Gossamer Fineness. The above are specimens of Bobbin lace. (1) Guipure. (2) Valenciennes. (3) Point d'Angleterre. (4) Mechlin. (5) Brussels, Flemish. (6) Brussels, Saxony. (7) Chantilly. (8) Irish, Limerick.

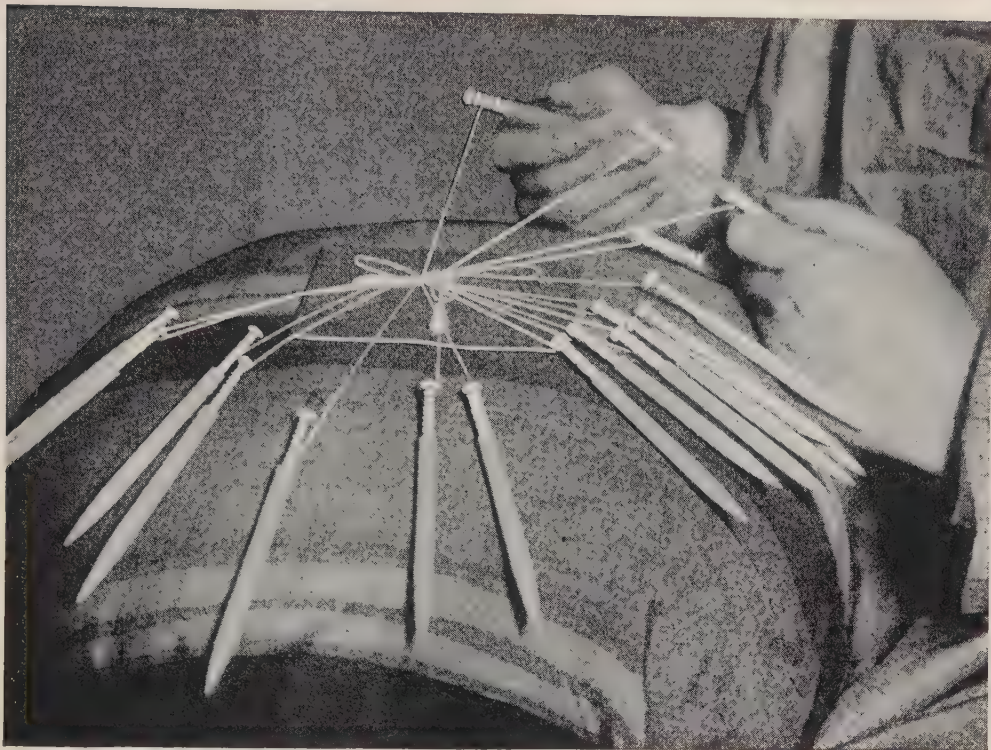


Photo: Keystone

MAKING A HONITON LACE DRAGON FLY

Honiton is the best-known and the most beautiful of the English pillow laces. It is, to some extent, similar to Brussels, but has more individuality. The beautiful Irish lace is made at Limerick, and is highly valued. The lace industry of Russia is said to have developed in the seventeenth century, after a visit of Peter the Great to Paris, and the Russian varieties are therefore of French origin.

Gold lace and silver lace result from the use of copper-gilt and silver-gilt wire as embroidery. For the same purposes, gold thread is wound with gold, or silver wire is wrapped on white thread. The threads may be used in lace-making, or for braids and ribbons used for ornamentation on uniforms.

Machine-Made Laces. The various kinds of manufactured lace are largely made from cotton, although a fiber called *ramie* has been satisfactorily employed.

Nearly every kind of handmade lace can be copied so perfectly that it is sometimes difficult to distinguish the imitation from the genuine. While the enormous output and cheapness of machine lace have brought it within reach of all, the demand for the handmade varieties has not declined.

The first crude form of a lace machine was invented in 1758, and a lace was at once produced in imitation of Brussels. A really prac-

tical device was not brought out until 1809. This is said to have been suggested by machinery used in making fish nets.

LACEDAEMON, *las e de' mun*. See SPARTA (Early History).

LACE-WINGED FLIES, a family of insects whose name is most appropriate, for their beautiful lacy wings remind one of gauze on an openwork frame. The lacewings are not true

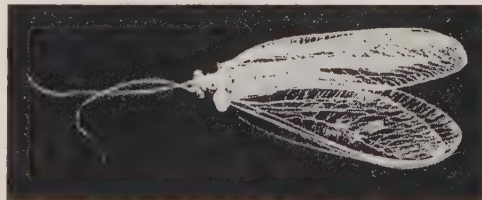


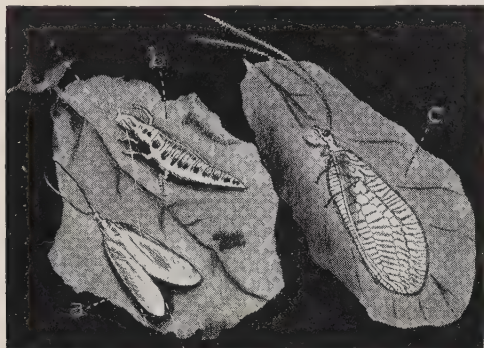
Photo: Visual Education Service

GREEN LACE-WINGED FLY

The larva is a very beneficial insect.

flies, all of which have two wings; they belong to the order of nerve-winged insects, *Neuroptera* (see INSECT). The adult lacewing has two pairs of very thin wings, thickly netted with veins. The yellow-green body is fragile-appearing, and the eyes are a bright golden color. Lace-winged flies deposit their eggs singly on the tips of small, threadlike stems, attached at the other end to leaves or twigs.

This peculiar custom prevents a newly hatched larva from eating the unhatched eggs left on the tiny stalks, for it respects not its own kind. The larvae are voracious eaters of plant lice, or aphides, and are known as *aphis lions*. Their



STAGES IN DEVELOPMENT

(a) Adult, three-fourths natural size; (b) the grub, about one-half size; (c) the adult, magnified about one and one-fourth times.

predacious habits make them friends of man, for aphides are very destructive to many plants. When the larva is full grown, it spins a silken cocoon about itself, and within two weeks or less, the winged insect emerges through a neat little trap door which it has cut in the top of the case.

W.J.S.

Classification. The lace-winged flies belong to the family *Chrysopidae*.

LACHESIS, *lak' e sis*, one of the three Fates (which see).

LACHINE, *lah sheen'*, **CANAL**. See CANADA (Transportation: Canals); illustration, page 1131; SAINT LAWRENCE RIVER.

LACHLAN, *lahk' lan*, **RIVER**. See AUSTRALIA (Rivers and Lakes).

LACHRYMAL, *lak' ri h mal*, **BONES**. See FACE.

LACHRYMAL GLANDS, two small bodies, each about the size of an almond, lying in the upper and outer part of the cavities which hold the eyes. A fluid secreted by these glands is carried to the eye by several minute ducts which lead through the *conjunctiva*, the thin, fine membrane that lines the lid, and from there passes over the ball of the eye. The continual secretion of a small amount of this fluid effects an unnoticeable washing of the eye, freeing it of dust and foreign bodies. This fluid next passes through two small openings in the lower lids into the lachrymal sacs, and down the lachrymal ducts into the lower portion of the nose. An unusual secretion of moisture, on account of irritation of the eye or through excessive emotion, overflows the lower lid as tears. See EYE.

K.A.E.

Derivation. The name of these glands is from the Latin *lacrima*, meaning *tear*, and *glans*, meaning *acorn*.

LACKAWANNA, *lak a wahn' ah*, N. Y. See NEW YORK (back of map).

LACKAWANNA RIVER, a small stream rising in the northeastern part of Pennsylvania, in whose valley are found the largest and most important anthracite coal beds in the United States. It flows for about fifty miles through narrow defiles formed by the Shawnee and Moosie mountains, emptying into the north branch of the Susquehanna at Pittston. All along its banks are great rolling mills, collieries, and blast furnaces.

LACKLAND, a name applied to the English king John (which see).

LAC LA RONGE, *lahk lah rahNzh'*. See SASKATCHEWAN (Surface and Drainage).

LAC LEMAN, *le mahn'*. See SWITZERLAND (Famous Lakes: Geneva).

LACONIA, *la ko' nih ah*, in ancient times the most important division of Southern Greece, or the Peloponnesus, famed as the country of the Spartans. It lay in the extreme southern part of the Peloponnesus, and was bounded on the west by Messenia and on the north by Arcadia and Argolis. Its eastern and southern shores were washed by the Mediterranean Sea. Through its central part extended the deep valley of the Eurotas River, which gave to this region the name "Hollow Lacedaemon." Sparta, capital city of Laconia, was situated in the western part. In the Homeric poems, Laconia is described as the realm of Menelaus, husband of the beautiful Helen of Troy. Modern Laconia is a political division of Greece. For the history of the country, see the article SPARTA.



LOCATION MAP

Derived from Laconia. The Laconians were noted for their brevity of speech, a characteristic from which the modern word *laconic* is derived. A laconic expression is one that is short, concise, pointed, pithy.

LACONIA, N. H. See NEW HAMPSHIRE (back of map).

LACQUER, *lak' ur*, **WARE**, a beautiful product of Oriental countries, is made by applying many successive coats of a certain varnish to trays, boxes, dishes, vases, furniture, and numerous other articles, large and small. The true lacquer of Japan and China is obtained from the sap of the varnish tree (*Rhus vernicifera*), though the shellac of American and European countries is often called lacquer.

This, however, is a product of the lac insect (see LAC).

The Japanese, who excel in the brilliancy, beauty of design, and durability of their ware, learned the art from the Chinese, probably in the sixth century. A piece of Japanese lacquer ware has perhaps thirty-five thin coatings of black lacquer, each dried and highly polished before the application of the next, on a foundation of wood sometimes as thin as paper. The decorators draw their pictures with powders of gold, silver, and colors, and cover them with a protecting coat of transparent lacquer.

The best work is exceedingly artistic, and so durable that a lacquered door may be in daily use for centuries without deterioration. A collection of lacquer ware which had been shown at the Vienna exhibition of 1873 was recovered from a sunken ship; the ancient articles, more carefully made than the modern, were unharmed. Like painting, lacquer ware is often extremely valuable for its artistic excellence.

LACROSSE, *lah kros'*, the national game of Canada, taken over from the Indian tribes of the North. As originally played by the Indians, it was a truly Homeric game; the warriors of two tribes contended in full war paint, and as many as 1,000 players are said to have participated.

The object of lacrosse as it is played to-day is to carry or drive a small rubber sphere between the enemy's goal posts. The *crosse*, with which the ball is thrown or carried down the field, consists of a curved hickory staff with a network of rawhide or gut stretched loosely across the end. It resembles slightly a long-handled tennis racket with loose network. The goals are set up at a distance of from 100 to 150 yards apart, the goal posts being six feet high and the same distance apart. Each side, consisting of twelve players, struggles to send the ball through the enemy's goal posts as often as possible in the two periods of play.

The play is begun by placing the ball in the center of the field, with the two opposing centers holding their crosses in position on each

side of the ball. At the signal, each of the players attempts to scoop up the ball on his crosse and carry it to goal. The ball itself may not be touched with the hand; it may be kicked or thrown with the crosse, but long throws are rather infrequent. Most commonly the ball is advanced on the crosse and passed from player to player. Canada has a National Lacrosse Association, founded in 1867, and several colleges of the United States have organized a league of clubs. See illustration, page 3836.

LA CROSSE, WIS. See WISCONSIN (back of map).



OLD CHINESE CHEST
Lacquer in red, black, and gold.

LACTALBUMIN, *lak tal bu'-min*, the albumen in milk. See ALBUMEN.

LACTATION, *lak ta' shun*, **PE-RIOD**. See CATTLE (The Dairy Type).

LACTEALS, *lak' te alz* (from the Latin *lacteus*, meaning *milky*), is the name applied to numerous tiny vessels of the small intestine, whose function is to convey the milklike fluid called *chyle*, during the process of digestion, to the blood. The lac-

teals originate in small projections of the mucous membrane of the intestine, the *villi*, each of which has its own lacteal vessel or network of vessels. The lacteals communicate with larger branches located in the outer coats of the intestine, uniting finally to form large trunks which empty into the *thoracic duct*. The latter tube runs upward close to the backbone and communicates with the left subclavian vein. Through this duct and the subclavian vein the nutritive food material contained in the chyle is carried from the lacteals into the general circulation.

K.A.E.

Related Subjects. The reader is referred in these volumes to the following articles:

Chyle	Intestine	Thoracic Duct
Digestion	Lymph	Villi

LACTIC, *lak' tik*, **ACID**, from the Latin *lac*, meaning *milk*, is the name applied to several acids containing carbon, hydrogen, and oxygen, the most important of which, ordinary lactic acid, is the characteristic ingredient of sour milk. It is this acid which is developed in cream when it is "ripened" in preparation for churning (see BUTTER). In a pure state it has the form of a transparent, colorless, syrup-like

liquid, and is a product of fermentation (which see). In the body it is found in the stomach and intestines and in the brain and muscles. A watery solution containing seventy-five per cent of lactic acid is a well-known drug, sometimes used in dissolving the membrane in cases of diphtheria, and in the treatment of stomach disorders. *Sarcrolactic acid*, a substance having the same chemical composition as ordinary lactic acid, is found in the blood and is an important constituent of muscle. T.B.J.

Chemical Formula. Lactic acids have a composition corresponding to the formula $C_3H_5O_3$; that is, a molecule contains three atoms of carbon, six of hydrogen, and three of oxygen. Each kind of lactic acid has its particular grouping of these atoms.

LACTIC-ACID THERAPY, a method of treatment for digestive troubles

soured milk, and may be obtained in liquid form in many drug stores dispensing soft drinks. The germs multiply very rapidly in the intestines, where they set free lactic acid, which holds fermentation in control. There are now a number of preparations on the market used for the same purpose, but they are not of standard composition, and are not to be relied upon, until proved to be effective. Fresh buttermilk is more effective than such preparations. Metchnikoff's theory that preparations of sour milk will retard old age is not accepted by modern biologists. See **METCHNIKOFF**, ELIE.

LACTOMETER, *lak-tom' e tur*. See **HYDROMETER**.

LACTOSE, *lak' tose*. See **BIOCHEMISTRY** (Substances in Animals and Plants); **CARBOHYDRATES**.



Photos: U & U

LACROSSE IS A STRENUOUS GAME

Above, a graceful action picture of a game of lacrosse by girls of Wellesley College. Below, Maryland and Navy teams in a spirited contest in Washington, D. C. (See article, page 3835.)

through the administration of lactic acid. The acid is usually given through the agency of soured milk, which is heavy with lactic germs. Elie Metchnikoff, of the Pasteur Institute, in Paris, was the outstanding biologist to advocate the treatment. He experimented with the cultures of the lactic germ, and administered it in the form of a powder or tablet. It is frequently given as Bulgarian

LADIES' EARDROPS. See **FUCHSIA**.

LADING, *la' ding*, **BILL OF**. See **BILL OF LADING**.

LADISLAS I. See **POLAND** (Early History).

LADOGA, *lah' doh gah*, Europe's largest lake, was formerly entirely in Russia, but now about one-half is in Finland. It lies forty miles northeast of Leningrad, and is 7,000

square miles in area, or nearly one-fourth as large as Lake Superior. As it is dangerous for small craft on account of its rocks and shallows, several canals have been constructed along its southern and southeastern shores, upon which thousands of vessels sail each year.

LADRONE, *lah drone'*, ISLANDS. See PACIFIC ISLANDS.

LADYBIRD, also known as **LADYBUG**. These names are applied to a large family of little beetles because of their shapely bodies and attractive coloring. The beetles are rounded or convex in form, and are often bright red or yellow, with black, red, white, or yellow spots. The ladybirds feed chiefly on plant lice and scale insects, for the destruction of which they are highly regarded by fruit-growers. Two species, however, damage beans, melons, squashes, and other garden plants. W.J.S.

Classification. The ladybird beetles constitute the family *Coccinellidae*. There are about 150 species known in the United States. See **BETTER**.



THE LADYBIRD

(a) Larva; (b) pupa; (c) adult insect. These are much enlarged. (d) Full-grown ladybird, only slightly enlarged.

LADY GODIVA. See **GODIVA**, **LADY**.

LADY JANE GREY. See **GREY**, **LADY JANE**.

LADY MACBETH. See **SHAKESPEARE**, **WILLIAM** (Synopsis of the Plays).

LADY'S SLIPPER, a popular name for various beautiful plants of the orchid family. The name refers to the large, inflated lip of the corolla, the shape of which suggests a slipper. Of the ten species found in North America, three are among our loveliest and rarest wild flowers. The *pink lady's slipper*, or *moccasin flower*, is described elsewhere in these volumes under the latter title. The *yellow lady's slipper*, which has beautiful, waxy yellow flowers with spirally twisted petals, is gradually disappearing from the swampy thickets where it once grew abundantly. Thousands of the plants have been plucked because the fibrous roots were believed to yield a nerve tonic. The tall-growing *showy lady's slipper* is an inhabitant of northern woods. It may be recognized by its large white flowers, marked at the lip with brilliant pinkish-purple. B.M.D.

Scientific Names. The lady's slippers belong to the family *Orchidaceae*. The pink species is *Cypripedium acaule*, *Cypripedium* meaning *slipper of Venus*. The



Photo: Visual Education Service

THE LADY'S SLIPPER

larger yellow species is *C. pubescens*; there is also a small-flowered yellow species of delicate scent known as *C. parviflorum*. The showy lady's slipper is *C. hirsutum* or *spectabile*.

LADYSMITH, SIEGE OF. See **SOUTH AFRICAN WAR**.

LA FARGE, *la fahrzh'*, JOHN (1835-1910), an American painter who worked with equal success in oil, water colors, on wood, and on glass. His subjects included flowers, religious themes, portraits, and landscapes. He was born in New York City and studied in Paris. After the completion of the mural decorations for Trinity Church, Boston, he turned his attention to glass-painting and window-designing, in which he had marked success. In coöperation with Saint Gaudens, he designed the King sepulchral monument at Newport, R. I., while a notable example of his work in mural decoration may be seen in the Minnesota State Capitol, Saint Paul. Among his finest works is the large altarpiece in the Church of the Ascension, New York City, executed in 1887. *The Arrival of the Magi* is one of his best-known paintings. His trip to Japan and the islands of the Pacific Ocean resulted in the completion of innumerable water-color sketches of native life and scenes. La Farge also wrote many valuable articles on art for the leading periodicals.

LAFAYETTE, *lah fa yet'*, IND. See **INDIANA**. (back of map).

LAFAYETTE, MARIE JEAN PAUL YVES ROCH GILBERT DU MOTIER, Marquis de (1757-1834), a famous French soldier and statesman, who holds in the affections of the American people a place as high as do the heroes of their own



Photo: Brown Bros.

MARQUIS DE LAFAYETTE

country. He was born in the castle of Chavagnac, in Auvergne, September 6, 1757, and was left an orphan in possession of large estates, when but thirteen years of age. When sixteen years old he married and entered the army, and three years later, fired by youthful enthusiasm for the new republic proclaimed in America, set out with eleven companions in a ship fitted out by himself, to offer his services to the colonists.

A Youthful Major General. Lafayette was at once made a major general in the American Revolutionary army, and in spite of his youth, soon became one of the most efficient members of Washington's staff. At no time did he command a large force, but in every position in which he was placed, he showed great courage and developed unusual military skill. At

Brandywine, at Barren Hill, and under Lee at Monmouth, he won well-deserved praise, but in 1779 felt compelled to return to France, for England had declared war against his own country.

After performing notable service at home for the colonists by enlisting French sympathy, securing reinforcements of soldiers, and obtaining financial assistance, Lafayette returned to America in May, 1780. He was a member of the court of officers who tried Major André and condemned him to death. His most distinguished military service was against Benedict Arnold in Virginia, in 1781, and in the campaigns against Cornwallis which led to the decisive Battle of Yorktown. For Lafayette's part in the victory of Yorktown, which practically decided the war, he received the public thanks of his great commander in chief.

Later Visits to America. Lafayette revisited America twice, in 1784 and again in 1824-1825, and both times was received with the most cordial enthusiasm and affection. The latter visit was, in fact, in the nature of a triumphal progress, for Lafayette's firm support of democratic principles in France had increased the esteem in which he was held in America. Congress voted him a grant of \$200,000 and a township of land in Florida. He was sent home on a new vessel named the *Brandywine*, in memory of the first battle in which he distinguished himself in America. During the years that have since passed, over twenty cities and towns in the United States, besides many counties, have been named in his honor.

A Reformer at Home. On his return to France, in 1782, Lafayette at once showed his desire for reform. In 1787 he was called to the Assembly of Notables, and he took a prominent part in the calling of the States-General and its transformation into the National Assembly. In that body he presented a declaration of rights based on the Declaration of Independence of the American colonies. After the Bastille had fallen, he was made commander in chief of the National Guard, which he did much to organize on an efficient basis. It was he who proposed the tricolor cockade, and he who saved the lives of the king and queen, Louis XVI and Marie Antoinette, at the time of the attack on Versailles.

Influence Lost and Regained. But the period of his great influence was passing, for he managed to satisfy neither party. His demand for order and moderation angered the radicals; his republican zeal won him the hatred of the royalist party, and at times his life was in danger. When war was declared against Austria and Prussia, he was placed in command of an army on the frontier, but in August, 1792, the Jacobins sent messengers to remove him from his command and arrest him. Escaping from these, he fell into the hands of the

Austrians, who held him prisoner for five years. Napoleon Bonaparte procured his release, but Lafayette did not favor the ambitions of Napoleon, during whose period of rule he lived in retirement.

In 1815, when Napoleon was sent to Saint Helena, the monarchy was restored and Lafayette took his place in the Chamber of Deputies, where he was always on the side of the Liberalists. The revolution of 1830 enlisted his sympathy; he was one of its chief promoters, and acted again as commander in chief of the National Guard.

Estimate of His Character. Lafayette is one of the popular heroes for whom no apologies are needed, for in all his long public life he said and did nothing which could stain his reputation. Brave, disinterested in his motives, devoted to liberal ideals to the point of sacrificing his fortune to them, he escaped even the unjust reproach which so many good men have been forced to bear.

Related Subjects. The reader is referred in these volumes to the following articles:

André, John	French Revolution
Bastille	Jacobins
Bonaparte, Napoleon	Revolutionary War

LAFAYETTE, MOUNT. See WHITE MOUNTAINS; NEW HAMPSHIRE (The Land).

LAFAYETTE COLLEGE. See PENNSYLVANIA (Education).

LAFAYETTE NATIONAL PARK. See PARKS, NATIONAL; MOUNT DESERT.

LAFITTE, lah feé', JEAN (1780-1826), a smuggler, desperado, and pirate whose exploits rivaled those of Captain Kidd (which see). He was born in France, and entered the smuggling trade at New Orleans in 1809, his headquarters being located in Barataria Bay, on Grand Terre Island. Lafitte headed a band of desperadoes who preyed upon the vessels of all nations. In 1814 he was captured, with his stronghold, by the United States government, but he and his followers made their escape. In 1815 the British offered him \$30,000 if he would join their attack on New Orleans. He refused the offer, and tendered his services to General Jackson, whom he assisted in the Battle of New Orleans, January 8, 1815. Lafitte was pardoned by the Federal government as a reward for his services. He died in Yucatan. The story of his life has been told by Joseph H. Ingraham in his *Pirate of the Gulf*.

LA FOLLETTE, lah fah! et, the name of an American family actively identified with the Progressive movement in state and national politics. Two of the La Follettes, father and son, were elected to the United States Senate by Wisconsin voters.

Robert Marion La Follette, Sr. (1855-1925), whose vigorous tactics won him the title "Battling Bob,"

was born at Primrose, Wis. Left fatherless when only a few months old, as a boy and young man he bore the burden of supporting his family, and at the same time paid for his own education. In 1880, the year following his graduation from the University of Wisconsin, he was admitted to the bar, at once opened his own office, and before the end of the year had been elected district attorney of Dane County. His success was due partly to a personal canvass of his district, and partly to his skill in raising a distinct issue for his campaign.

After four years as district attorney, La Follette was elected to the national House of Representatives. When he took his seat, in 1885, he was the youngest member of the House, but he soon won recognition as a speaker and as a hard worker. He served in the House for six years, and during his last term, as a member of the Committee on Ways and Means, had an important part in framing the McKinley Bill of 1890, a protective-tariff measure.

At the election of 1890, La Follette's constituents showed their disapproval of his activities by defeating him. Then for ten years he practiced law at Madison, but continued to take an active part in Republican politics. About the year 1895, he was becoming recognized as the leader of a group of Republicans who were in revolt against political conditions in his state. Against those controlling affairs, La Follette took up the fight with characteristic vigor. His ideas on reform were outlined in two pamphlets written in 1897—one called *The Menace of the Machine*, the other *The Nomination of Candidates by Australian Ballot*. La Follette's followers were called the "Half-Breeds"; the opposing Republicans were the "Stalwarts." Finally, in 1900, the "Half-Breeds" succeeded in electing La Follette as governor.

His inauguration was the beginning of an era of progress which made Wisconsin for more than a decade the model for political reform. Most of the "advanced" legislation urged by La Follette was literally forced upon his opponents. Direct primaries, equalization of taxation, control of railroad rates, and publicity for campaign expenditures are a few examples of the reforms he achieved. He was twice reelected, but at the beginning of his third term, in January, 1905, he resigned the governorship to become United States Senator, an office to which he was reelected in 1910, 1916, and 1922.

In the Senate, La Follette supported advanced legislation and fought reactionary laws with a boldness that made him the leader of the "Insurgents," as the progressive Senators came to be called. In 1908 his name was mentioned for the Republican nomination for President, but he was defeated in the convention by William H. Taft. When, in 1912, the progressive elements of the country chose Theodore



Photo: U & U

ROBERT M. LA FOLLETTE, SR.

For many years one of the leaders of the American Congress.

Roosevelt instead of La Follette for their candidate against President Taft, the Senator was bitterly disappointed, and charged that he had been unfairly treated. He continued to work for advanced legislation, however, sponsored the Seamen's Bill, providing for improved conditions for American sailors (1915), and in 1916 came into prominence as an advocate of an embargo on the shipment of American arms to the Allies.

As the relations between Germany and the United States grew increasingly strained, Senator La Follette stood forth as the spokesman of those who favored strict neutrality and were opposed to any act that might lead to war. He led a filibuster in the Senate when President Wilson asked for legislation empowering him to arm American merchant vessels, and was one of the small pacifist group that voted no on the declaration-of-war resolution. La Follette's attitude throughout the period of America's participation in the war made him very unpopular, and even his own state turned against him for a time. He never swerved from what he considered a right cause, however; led the battle against America's joining the League of Nations; and eventually regained the confidence of his state, which reelected him to the Senate by a large majority, in 1922.

In 1924, when the regular Republican convention nominated Calvin Coolidge and rejected the radical platform presented by the Wisconsin delegation, a Convention for Progressive Political Action assembled in Cleveland, O., in July, and endorsed Senator La Follette for President. A new Progressive party was organized, which received the support of the American Federation of Labor, the Socialist party, and other radical groups. La Follette waged a vigorous campaign, but in the fall election carried only his own state. His popular vote was 4,686,681. Shortly after this climax to his career, La Follette's health began to fail, and he died in Washington, the scene of so many hard-fought battles, in June, 1925. In 1929 the state of Wisconsin presented to the Federal government a statue of La Follette, for Statuary Hall (which see). See PROGRESSIVE PARTY.

Robert Marion La Follette, Jr. (1895-), succeeded his father as Senator in September, 1925, hav-

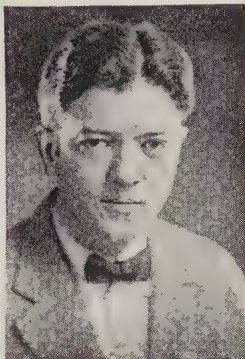


Photo: U & U

ROBERT M. LA FOLLETTE, JR.

ing been elected to fill the unexpired term, by a large vote. At that time he was the youngest member to be elected to the upper house of Congress since 1806, when Kentucky sent Henry Clay to the Senate. Robert, Jr., was born in Madison, Wis. He was secretary to his father for six years, and succeeded him as leader of the Progressive Republicans in Wisconsin. In the Senate he associated himself with the insurgent group. In the election of 1928, he was a candidate to succeed himself, and received an overwhelming endorsement, though the candidate for governor of Wisconsin, whom he opposed, was also elected. He is the editor of *La Follette's Magazine*.

LA FONTAINE, *lah fawN tane'*, **JEAN DE** (1621-1695), one of the greatest of the poets of France, and universally known through his *Fables*. Unambitious and absent-minded, he relied much on the hospitality that was characteristic of the period, and through his verses made many influential friends, who provided for him throughout his life. Although beloved by Molière, Boileau, Racine, and other clever men of Paris, for his simplicity and candor, his unconventionality earned the enmity of Louis XIV, who confirmed his nomination to the French Academy with reluctance. See FRENCH LITERATURE (The Golden Age).

La Fontaine's Writings. His first work, an unsuccessful adaptation of the *Eunuchus* of Terence, came out in 1654. Ten years later appeared his *Tales*, spontaneous and delicate in style, but disapproved as immodest. The *Fables*, published in 1668, lack this impropriety; they possess grace, jovial satire, and unobtrusive morals, and are familiar to every French schoolboy.



Photo: O R O C

HOME OF THE NOVELIST

Selma Lagerlöf lives in the Vermland region of Sweden, made famous by her pen.

LAGER, *lah' gur*. See BEER.

LAGERLÖF, *lah' gur luf*, [OTILIA LOVISA] **SELMA** (1858-), a Swedish novelist, and the only woman to be elected a member of the Swedish Academy, was born on the family estate in Vermland, Sweden. She was educated at Stockholm, and following her

graduation, taught school for ten years. While she was still teaching, she wrote her first novel, *The Story of Gösta Berling*. This book met with an immediate and brilliant success, and marked the decline of the morbid pessimism which had been the literary vogue in Sweden. The *Miracles of Anti-Christ*, a record of the author's travel in Italy, was published in 1897, and was even more popular than her first work. Commissioned in 1902 by the National

Teachers' Association of Sweden to write a school textbook which would present in narrative form the folklore and geographical conditions of Sweden, Miss Lagerlöf produced *The Wonderful Adventures of Nils*, a children's classic. In 1909 she received the Nobel prize in literature (see NOBEL PRIZES), largely because of the recognition given *The Story of Gösta Berling*.

Other Writings.

Among Miss Lagerlöf's other books are *From a Swedish Homestead*, *Invisible Links*, *The Girls from Marsh Croft*, *Jerusalem, Demons and Men*, *Marbacka*, and *Charlotte Lofvenskold*. A number of others are less important.



SELMA LAGERLÖF

LAGO D' AVERNO, *lah' go dah vur' no*, an Italian lake famed in the days of mythology as *Avernus* (which see).

LAGO MAGGIORE, *mahd jo' ra*. See MAGGIORE, LAKE.

LAGOON, a shallow body of water at the mouth of a river, or between sand reefs and the mainland along sea and lake coasts. Occasionally, the marshes formed by the gradual filling of such places with sand are called lagoons, but such use of the word is incorrect. The still water enclosed within an atoll, or coral island composed of reefs which form an irregular circle, is also called a lagoon, and the meaning has been extended to include artificial lakes and canals in parks. The city of Venice is built upon numerous small islands in a large lagoon between the mouths of the Piave and Po rivers.

R.H.W.

Derivation. *Lagoon* is from the Latin *lacuna*, meaning a gap, or hollow.

LAGOS, *lah' gohs*, the capital of Nigeria (which see).

LAGRANGE, *lah granje'*, GA. See GEORGIA (back of map).

LA GRIPPE. See INFLUENZA.

LAGTHING, *lag' ting*, the Parliament of the Faroe Islands (which see).

LA GUAYRA, *lah gwi' rah*. See VENEZUELA (The Cities: Caracas).

LAHORE, *lah hore'*. See INDIA (The Cities).

LAJUS, *la' ih us*, king of Thebes. See OEDIPUS.

LAJOIE, ANTOINE GERIN. See CANADIAN LITERATURE (French Canada: Fiction).

LAKE, a body of water surrounded by land. The distinction between a lake and a pond is not clear. A pond is a small body of water not large enough to be dignified by the name

of lake, but how large a pond must be before it is a lake is a matter of opinion. Some large bodies of water commonly known as seas are really lakes. The Dead Sea, Sea of Galilee, and Caspian Sea are all of them lakes. Scientists agree that no matter what the cause of the formation of a lake, it is formed but to perish, and the life of a lake, speaking in geological terms, is limited. It may be destroyed by a change of climate, by volcanic action which changes the contour of the country, or it may shrink by apparent evaporation. Lakes which have a river outlet are destined to find that the river has gradually worn away the barrier which holds the lake waters in place.

Lakes may be formed by natural collection of water in extinct volcanoes, such as Crater Lake, in Oregon; by rivers which deposit silt until the natural outlet to the sea is closed; by the melting of the ice in the Glacial Epoch (which see); by earthquakes that cause slides which block the flow of rivers; by the windings of rivers that form oxbow lakes or bayous; or by other causes. Lake Geneva, in Switzerland, was formed by the subsidence of part of the Alps. Lakes occur in all parts of the world, but are more frequent in high than in low latitudes.

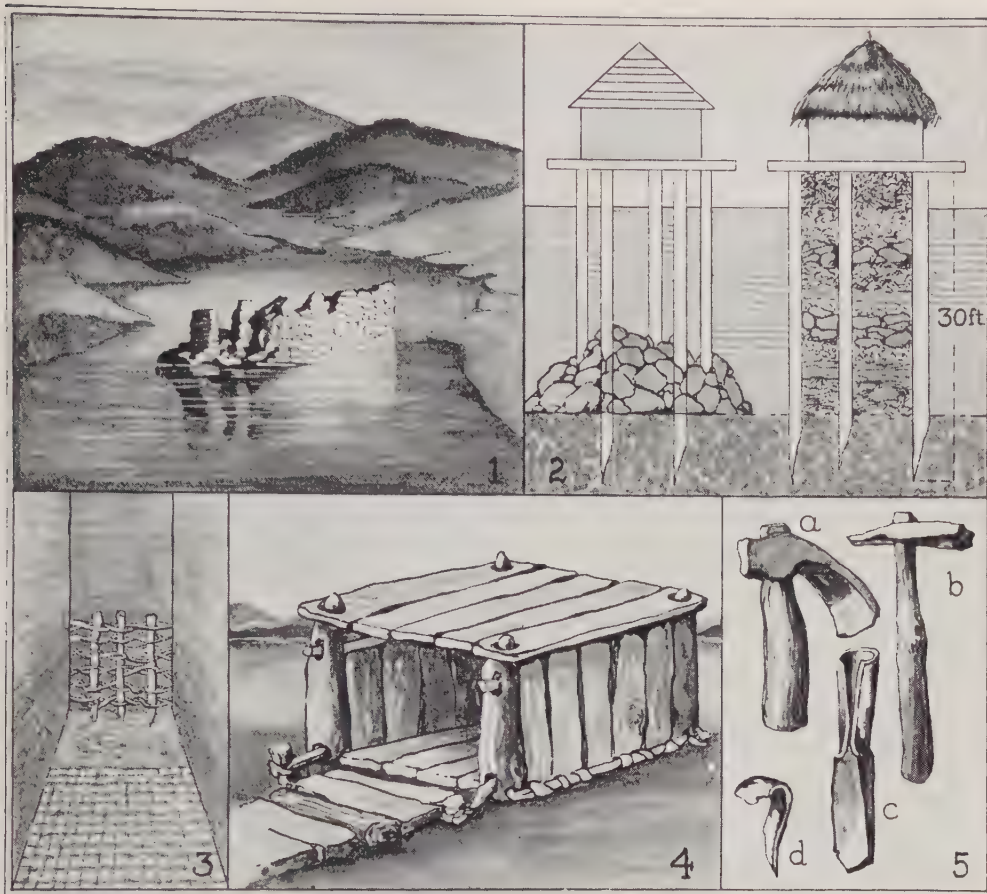
Some lakes are at a considerable elevation above sea level, while others, as in the case of the Dead Sea, are many feet below that level. Lake Titicaca, in the midst of volcanic territory in South America, is 12,500 feet above the sea; the Dead Sea is 1,292 feet below sea level. Many basins of lakes have been scoured out of the rocks by glaciers. In Minnesota alone, it is estimated that there are nearly 10,000 lakes due to glacial action, and Cayuga Lake in New York is another striking example of glacial scouring. In addition to the numerous lakes found in all parts of the world, there are equally numerous basins in which lakes once existed. The lakes that now exist will in time vanish, leaving basins that will be rich for cultivation.

The Great Lakes have been formed partly by glacial action and partly by the damming of rivers, causing the pent-up waters to overflow into the surrounding valleys. Some lakes are basins in which water has accumulated, fed by rivers and mountain streams, with the surplus waters drained off by other rivers; others apparently have neither inlet nor outlet. In contrast, others have streams which bring a continual supply of water, but which have no outlet. The Great Salt Lake is a striking example of this.

Effect Upon Temperature. The presence of a large body of water, such as any one of the Great Lakes, somewhat modifies the weather conditions for several miles in every direction. In summer a large body of water never gets

LARGEST FRESH-WATER LAKES *of the* WORLD





INTERESTING FACTS RESPECTING LAKE DWELLINGS

(1) In the Irish annals, lake dwellings are called crannogs, a word derived from *crann*, which signifies *tree*. Lake dwellings of Ireland are chiefly of wood; an exception is shown in the illustration, which is a remnant of stone lake dwellings in Lough Bola, County Galway. (2) Sketch from parts of lake dwellings found near shore at Ober Meilen, on Lake Zurich, Switzerland. A prolonged drought lowered the lake in 1853 and brought them to light. Later lake dwellings of like kind were found in almost all Swiss lakes, always in deep water. Piles were reinforced by deposits of stones, etc., as shown. (3) At Longhrea, County Galway, Ireland, were found basket- or wicker-work floors of crannog. The illustration shows the construction. (4) In Kilnamaddo, County Fermanagh, Ireland; a hut, or lair, for hiding—no more than four feet in height. It was found under seventeen feet of peat, in a district known to have been the basin of a sheet of water. The piling can be traced near here, although this crannog is thought to be a bog hut. Its age is unknown, but mortises seem to indicate the use of something more advanced than stone tools. (5) In a small lake called Cornagall, six miles from Cavan, Ireland, is a circular artificial island fenced with deep-driven oaken stakes. Tools were found here that were supposed to have been made by lake dwellers: (a) Adze of soft iron, with steeled cutting edge; (b) iron hammer, oak handle, wedged at end; (c) iron chisel; (d) iron tool for scraping. (See page 3844.)

as warm as the surrounding atmosphere, and therefore it cools the air perceptibly.

Conditions of agriculture near large bodies of water are materially changed. The great fruit belt of Michigan is along the east shore of Lake Michigan, where the influence of the winds from over the water modifies an otherwise rigorous climate and small fruits flourish. This great fruit belt is a comparatively narrow strip along the shore, extending from the southern point of the lake in Indiana northward for over 200 miles. The grape belt in New York lies along the shores of Lake Erie and

Lake Ontario, and the presence of these large bodies of water has made it possible to raise fruits of many kinds on the other shore, in Southern Ontario, where the climate would naturally be too severe.

R.H.W.

Derivation. The word *lake* is supposed to be derived from the Greek *lakkos*, meaning *hole*, or *pond*.

Related Subjects. The following lakes are treated in their proper alphabetical order in these volumes:

AFRICA

Albert Nyanza	Nyassa
Chad	Tanganyika
Edward, Lake	Victoria Nyanza

ASIA	
Aral	Caspian Sea
Baikal	Dead Sea
Balkash	Galilee, Sea of
CANADA	
Athabaska	Memphremagog
Bras d'Or	Muskoka Lakes
Champlain	Nipigon
Erie	Nipissing
Great Bear	Ontario
Great Lakes, The	Rainy
Great Slave	Saint Clair
Huron	Simcoe
Lake of the Woods	Superior
Louise	Winnipeg
Manitoba	
CENTRAL AMERICA	
Nicaragua	
EUROPE	
Avernus	Katrine
Caspian Sea	Ladoga
Como	Lomond, Loch
Geneva	Onega
SOUTH AMERICA	
Titicaca	
UNITED STATES	
Cayuga	Oneida
Champlain	Ontario
Erie	Pontchartrain
George	Rainy
Great Lakes, The	Saint Clair
Great Salt Lake	Salton Sea
Huron	Seneca
Lake of the Woods	Superior
Memphremagog	Tahoe
Michigan	Utah
Okeechobee	

LAKE AGASSIZ, *ag' ah se*. See AGASSIZ, LAKE.

LAKE CHAMPLAIN, BATTLE OF. See CHAMPLAIN; WAR OF 1812.

LAKE CHARLES, LA. See LOUISIANA (back of map).

LAKE DWELLINGS, habitations placed on platforms supported by piles or other foundations, within the margins of lakes or creeks at some distance from the shore. The name is generally applied to the prehistoric dwellings of which numerous remains have been found in the lakes of Switzerland and other parts of Southern Europe. These remains first became known to archaeologists in 1853 and 1854, when the discoveries were made in a lake near Zurich, although mention of a lake-dwelling community in Macedonia occurs in the writings of Herodotus, an historian of the fourth century B.C. Though unknown to history, the lakes and bogs preserved the story of the lives of those ancient builders.

Discoveries led to the belief that some of these curious villages were constructed during the latter half of the Stone Age (which see); that others were built after iron came into general use; and that about 4,000 years must have elapsed between the building of the first and the last of those now unearthed. It is safe to say that lake-dwelling culture in Europe began 12,000 to 14,000 years ago, and survived possibly 10,000 years. Remains of various grains and some fruits, as well as

bits of pottery, have been found. In Scotland and Ireland, where such communities also were numerous, they are known as *crannogs*, from the Celtic word *crann*, meaning a tree. The latter, however, were not constructed like the Swiss pile villages, but were generally artificial islets formed of brushwood, stones, and earth, and steadied by piles driven through and around the mass. See illustration, page 3843.

The custom of living in wooden houses erected on piles over the waters of a lake or inlet of the sea is still practiced by native tribes in the Malayan Archipelago, New Guinea, Venezuela, and in Central Africa; in fact, the name Venezuela (little Venice) was given because of the prevalence of these pile dwellings along its shores. C.W.

LAKE ERIE, BATTLE OF. See ERIE, LAKE, subhead.

LAKELAND, FLA. See FLORIDA (back of map).

LAKE OF THE WOODS, a body of water lying on the boundary between the United States and Canada. The greater part of its



LOCATION OF THE LAKE OF THE WOODS

surface, which is estimated at 2,000 square miles, lies largely in Western Ontario; about one-quarter is in Minnesota, and sixty square miles, comprising two small bays, are in Manitoba (see map under MINNESOTA). The lake is about sixty-five miles long, from ten to fifty miles wide, and about 300 miles in circumference. It is famous in history as the location of some of the first trading posts in the West, and also as an important factor in several boundary disputes between the United States and Great Britain. According to the treaty which ended the Revolutionary War, the boundary was to run from the northwest

angle of the lake "on a due course west to the river Mississippi." The later discovery of the Mississippi's source 100 miles south was naturally followed by disputes, but the present boundary was fixed by the Convention of London in 1818. In 1925 a Canadian-American treaty provided for the maintenance of the lake level.

The hilly shores and the dozens of islands are covered with the forests which have given the lake its name, and lumbering is the principal occupation of the region. Fishing is also important as an industry and as a sport, and the lake is now perhaps best known as a summer resort. Railways run along the northern and southern shores, and in summer there are excursion steamers. The Winnipeg River issues from the northern end of the lake.

LAKE POETS. See **LAKE SCHOOL**.

LAKES, insoluble coloring substances formed by combining metallic salts, or mordants (which see), with dyestuffs. There are two groups of lakes, those from natural colors and those from coal-tar colors. In the former group are carmine, madder, and Vienna lakes. Carmine lake is prepared by extracting the coloring matter of cochineal insects (see **COCHINEAL**) and is a beautiful shade of scarlet. The root of the madder, a plant, yields red madder lake, and Vienna lake (violet) has its source in Brazil wood. Coal-tar colors have practically superseded the natural dyestuffs. The various lakes yielded by these colors are used not only in calico-printing and silk-dyeing, but for decorative work, color-printing, and many other purposes. See, also, **DYEING AND DYESTUFFS**; **MORDANTS**.

T.B.J.

LAKES, GREAT. See **GREAT LAKES, THE**.

LAKE SCHOOL, OR LAKE POETS. Wordsworth, Coleridge, and Southey were so named by the *Edinburgh Review* because they chose to live in the lake district of Cumberland and Westmoreland. Their only characteristic in common was a dislike of the stiffness of the prevailing classicism and a determination to cultivate a simple and natural school of poetry. They wrote at the beginning of the nineteenth century, which was sometimes called the second age of English verse. See **ROMANTICISM**; **ENGLISH LITERATURE** (The Romantic Age).

LAKES-TO-GULF WATERWAY. The rivers and canals of the Middle United States once echoed to the passing of slow-moving barges and "side-wheelers," carrying on their outward journeys supplies for pioneer towns, and on their return the marketable products of pioneer farms. Then came the railroads with their rapid, bustling efficiency, and water traffic dwindled to minor importance. If judged by Europe's carefully developed and utilized system of freightage on canals and rivers, the United States seems a wastrel, allowing a fine natural system of waterways to go almost unimproved.

Several factors have caused a new interest in waterway development on the part of the government and local associations. New methods in river improvement, canal-building, and barge construction have made inland-water transportation more practical. Also, at the present rate of increase in population, greater transportation facilities will be needed within the next quarter-century; it is estimated that it would be far cheaper to develop water highways than to provide for increased commerce by a correspondingly great railroad expansion. The most important factor is the need for a cheaper way to send the products of the great agricultural section, the Middle West, to the seacoast and thence to world markets.

The projected Lakes-to-Gulf Waterway would meet these needs by opening a direct passage from Chicago to the Gulf of Mexico, thus providing freightage routes for the whole Mississippi Valley. According to the United States Department of Commerce, the Mississippi River and its tributaries can provide 9,000 miles of water highway; this includes both the direct route from Chicago via canals to the Illinois River and then through the Mississippi to New Orleans, and the routes formed by the Ohio, Missouri, and other tributary rivers. The project involves the uniform deepening of the Mississippi to a minimum of nine feet, so that a system of barges and towboats could furnish regular service from Chicago to the Gulf. The long section of the river from Saint Louis to New Orleans is thus improved, and is used for commerce. Other shorter sections are also deepened; a canal from the Illinois River near Hennepin, Ill., to the Mississippi near Rock Island provides an important link in the chain. Although improvement has been carried on for many years, it has been in disconnected sections, and the completion of a unified system is yet lost in the mazes of local and government politics.

The location of the northern end of the proposed waterway was a campaign issue in 1928, the favored route through Canada not being desired by many, who preferred that through New York state via the Erie Canal from Buffalo.

LAKEWOOD, OHIO, in Cuyahoga County, is a residential suburb adjoining Cleveland on the west, and fronting on Lake Erie for a distance of three miles (see **CLEVELAND**). Lake Avenue, one of the principal thoroughfares, is lined by the handsome residences of Cleveland business men. While Lakewood is known as the "City of Homes," there are a few manufacturing plants in the eastern part of the city, including those of the National Carbon Company, the Lakewood Engineering Company, and smaller plants. Population, 1928, 65,000 (Federal estimate).

E.D.B.

LAKH, *lak*, the sum of 100,000 rupees. See RUPEE.

LAMAISM, *lah' ma iz'm*, an offshoot from Buddhism, so called from its *lamas*, or priests. This cult had its origin in the seventh century A.D., and yet prevails among the Tartar tribes of Tibet, Mongolia, and Manchuria. Buddha is worshiped as the founder of the religion. See BUDDHISM.

LANANITES. See MORMONS (History of the Mormon Church: The Book of Mormon).

LAMAR, *lah mahr'*, LUCIUS QUINTUS CINNATUS (1825-1893), an American statesman, born in Eatonton, Ga., educated at Emory College (Oxford, Ga.), and admitted to the bar in 1847. After a short residence in Mississippi, he returned to Georgia and was elected to the legislature in 1855. Again, in Mississippi, he was twice made Congressman. In 1861 he resigned to become lieutenant colonel in the Confederate army. Lamar drafted the secession ordinance for Mississippi. After the war he was a member of the United States Senate (1877 to 1885), and from 1885 to 1888 was Secretary of the Interior in the Cabinet of President Cleveland. From 1888 until his death, Lamar was Associate Justice of the United States Supreme Court, having been appointed by President Cleveland.

LAMARCK, *lah marhk'*, JEAN BAPTISTE PIERRE ANTOINE DE MONET DE (1744-1829), a French naturalist, renowned for his researches in botany, zoology, and meteorology. He wanted to be a soldier, but his parents sent him to the Jesuit College at Amiens. Upon his father's death, in 1760, Jean enlisted in the army during the Seven Years' War, but because of an accident he left the army and went to Paris. There, for many years, he engaged in botanical work, meeting with such success that he was called "the French Linnaeus," after the famous Swedish botanist of that name. In 1793 the Museum of Natural History made him professor of the branch of zoology dealing with invertebrates. He originated several theories regarding the classification of animals and the theory of evolution, in advance of Darwin, and from 1799 to 1810, published each year a meteorological report, being the first scientist to attempt to forecast the weather. See EVOLUTION.

His Books. Lamarck was the author of several volumes, of which the most important are *Zoological Philosophy*, *Flora of France*, and *Animals without Backbones*.

LAMARTINE, *lah mahr teen'*, ALPHONSE DE PRAT DE (1790-1869), a French poet, born in Burgundy, whose *Meditations*, published in 1820, created a deep impression and brought him instant fame. His idealized autobiography is contained in his *Confidences* and *Raphael*. In the former, he tells of his love for Lucy, when

he was sixteen years of age; his voyage to Italy several years later; and his love for the fisherman's daughter, Graziella. In 1820 he was an under officer of the legation at Naples. His *New Poetic Musings* and the *Poetic and Religious Harmonies* obtained for him admission into the French Academy, and added to his literary eminence.

Other Works. In his *History of the Girondists*, Lamartine espoused the cause of the Revolution. As a history this work is unreliable, for it is not based on documents, but it is written in charming style. His *History of the Restoration* gives an interesting account of the literary salons of the times. Among his other writings are *Voyage en Orient*, *Jocelyn*, *Last Song of Childe Harold's Pilgrimage*, and *History of the Revolution of 1848*.

LAMB, *lam*, a young sheep. See SHEEP.

LAMB, CHARLES (1775-1834). The life of this English essayist and critic is an illustration of the fact that genius thrives in the most unlikely surroundings. What career could be



CHARLES LAMB

Photo: Brown Bros.

less exciting than that of a clerk in a trading company's office? What events could be less romantic, adventurous, or inspiring than the monotonous daily transactions in the office of the East India Company? Yet it was out of thirty-three years' experience in this humdrum existence that Lamb wrote his famous *Essays*

of *Elia*, which have been pronounced the finest of their kind in the English language.

Born in London, he attended school at Christ's Hospital, where he began to prepare himself to be a clergyman. But a serious impediment in his speech prevented the continuance of this course, and in 1789 he became a clerk in the South Sea House. This position he held until 1792, when he went to work in the accountant's office of the East India Company. A tragedy which darkened his entire life appeared first in 1795. He himself suffered from a brief spell of mental derangement, and soon after his recovery, the family was overcome with grief and horror at his sister Mary's fatal stabbing of her mother, during a fit of acute mania. Mary's attack passed off, but returned at intervals during the remainder of her life, and the brother gave himself gladly to the care of his sister, sacrificing the happiness of marriage with the "gentle maiden" whom he loved.

An inspiring influence in his life was his friendship with Samuel Taylor Coleridge, which began in their school days and was never broken. It was in a volume of Coleridge's poems that Lamb's first published writings appeared, four sonnets in the book *Poems on Various Subjects*. It was at the Coleridge summer home, too, that he met Dorothy and William Wordsworth, and formed another life-long friendship.

From 1825 until his death, Lamb lived upon a pension granted by the East India Company after his long period of service. Freedom from regular employment, however, seemed to hamper rather than to develop his genius, and in his last years he produced little of importance. He died in Edmonton, and was sincerely mourned by his large circle of friends, for his wit and geniality had made him a charming companion, and his unselfishness and loyalty had knit his friends firmly to him. In both his essays and his letters, his never-failing good humor, his gentleness, and his rare devotion to his family and friends are reflected with great clearness.

Summary of His Work. In the years 1796 and 1797, Lamb contributed poems to volumes brought out by Coleridge, and soon afterward published, with his friend Charles Lloyd, a volume entitled *Blank Verse*, in which appeared his best-known poem, *The Old Familiar Faces*. Next came *Rosamund Gray*, a story which had slight success, and within the next seven years the drama *John Woodvil* and the farce *Mr. H.*, both of which failed on the stage. It was not, indeed, until he produced, with his sister Mary, the *Tales from Shakespeare*, succeeded by his own version of the *Adventures of Ulysses*, that he became a popular writer. His *Specimens of English Dramatic Poets Who Lived about the Time of Shakespeare* showed him to be a critic of exceptional discrimination and sympathetic discernment, and brought to the notice of the literary public the merits of the hitherto almost ignored lesser dramatists of the sixteenth century.

More firmly than on any of these, however, his fame rests on the two volumes of *Essays of Elia*, which were written during the later years of his life, and appeared in the *London Magazine*. These essays, on a variety of subjects, are written in a genial, rambling style which few authors of his own or any other nation have equaled. Their particular charm lies in large part in the quaint humor, pure sentiment, and delicate fancy that pervade them, and in the unreserved and ingenuous manner in which the author reveals himself. They show Lamb at his best.

LAMBETH CONFERENCE. See ANGLICAN CHURCH.

LAMBKILL. See KALMIA.

LAMB'S WOOL. See WOOL.

LAMENTATIONS, *lam en ta' shunz*, one of the poetical books of the Old Testament, whose authorship is attributed to Jeremiah. It is an acrostic dirge (see ACROSTIC), and was composed for use by professional mourners in leading the wailing of the people over the fall of Jerusalem. Four of its five divisions are in the peculiar rhythm of the Oriental dirge, each line rising to a climax and then dying away to silence. The poem pictures vividly the desolation of the city and the sufferings of its inhabitants, and voices the sorrow of the people for their sin, which, as they believed, was responsible for the city's catastrophe. They hope for and then despair of forgiveness, and the closing section is a cry to Jehovah for judgment. See JEREMIAH.

LAMINATION, *lam in a' shun*. See BED (in geology).

LAMMERGEIER, *lam' mur gi ur*, the largest of the European eagles, also called the



THE LAMMERGEIER

griffin vulture, because of its partiality for dead and decomposed meat as food. Its great strength permits it to break carcasses into bits

or carry them to a great height in the air and then let them fall. In some regions it feeds upon tortoises. The lammergeier is about four feet in length, and measures from nine to ten feet across its wings. It is found in Northern Africa and Southern Asia, and sometimes in the mountains and deserts of Southern Europe. It builds a crude nest on a mountain ledge, where it lays one brown-spotted egg. Its plumage is beautiful, its flight majestic. See EAGLE. D.L.

Scientific Name. The lammergeier belongs to the family *Falconidae*. Its scientific name is *Gypaëtus barbatus*.

LAMP. There are many persons to-day who remember when kerosene lamps were the only devices for illuminating the home, and some-



Photo: Keystone

ONE OF THE OLDEST LAMPS

The illustration is that of a cobbler's lamp of the Middle Ages. It shows a clever use of globes of water to diffuse the light of a tallow candle.

times we hear an old person tell about the wonderful change from candles to oil lamps, recalled as one of the events of his childhood. Yet the story of the lamp is not a tale of two or three generations. It goes back to the days before recorded history. The earliest artificial lights were sticks set ablaze from the caveman's fire, and torches made from pine knots. Later, the caveman discovered the illuminating qualities of a lighted rush thrust into an animal's skull filled with melted fat. This device, though crude, embodied the essential principle of the modern oil lamp, and it was truly an invention of great importance.

The first real lamps were crudely hollowed-out stones in which were placed a wick and grease. The Greeks and Romans, with their genius for design, improved the appearance of the lamp and increased its illuminating power. They shaped shallow vessels of terra cotta and bronze, in which they poured olive oil. Sometimes several wicks were used, flax tow having by this time largely superseded rushes. To the ancients the lamp was not simply an article of domestic use. It was a symbol of wisdom, and often appears as a sacred emblem. The old Greek myth, which tells how Prometheus stole fire from the gods, reflects the feeling of the early world as to the sacred mystery of fire.

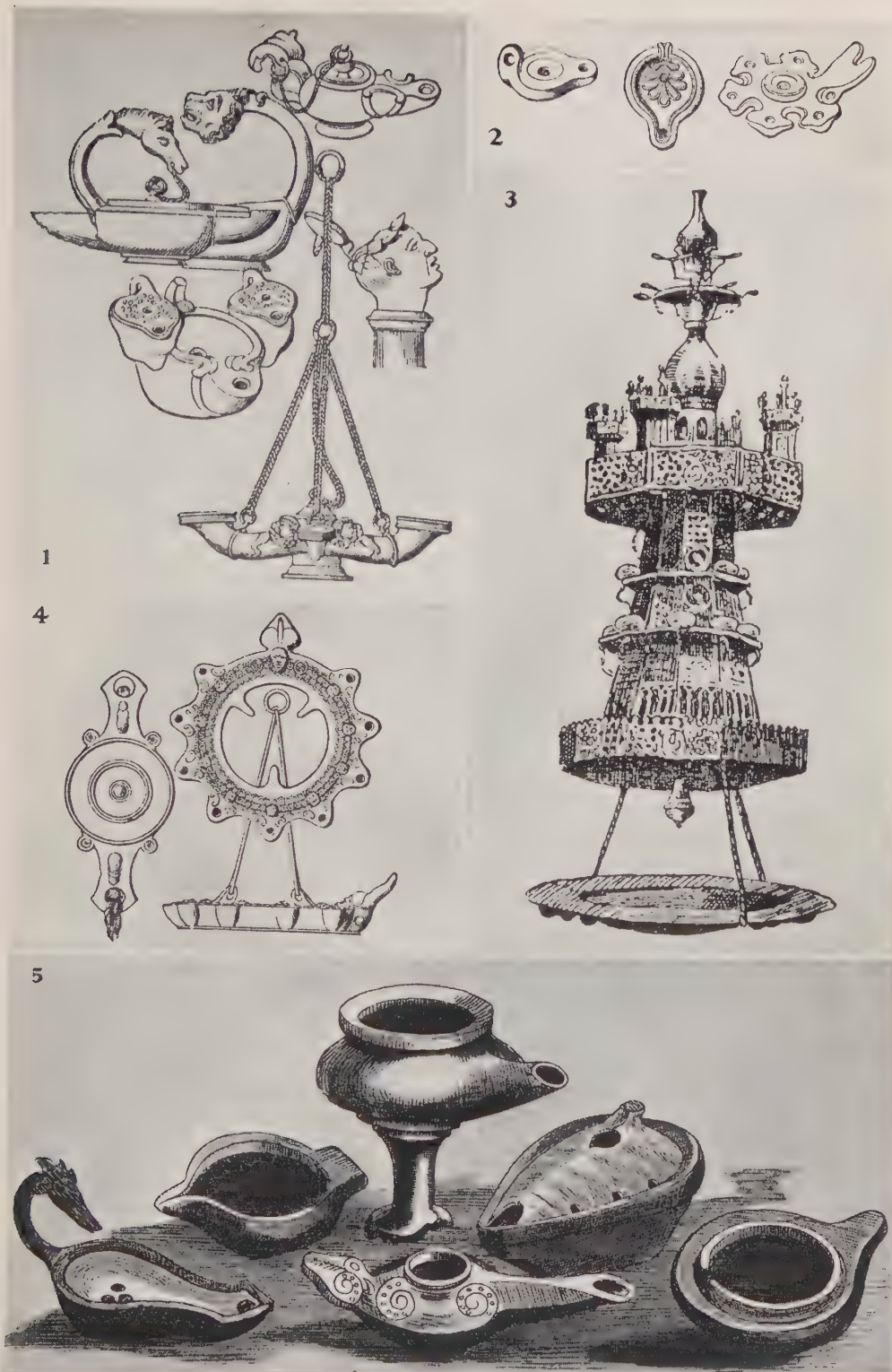
The Argand Lamp. No marked improvement in lamps took place until the end of the eighteenth century, when a Swiss chemist, Aimé Argand, substituted for the flat wick a tubular one set between two metal cylinders. A circular flame was thus produced, and both the inside and outside of this flame were supplied with air; the result was a clearer light and a lamp that did not smoke. Shortly afterward, one of his assistants happened to notice that a flame burns more brightly when held under a tube of glass. The result of this observation was the lamp chimney. After the discovery of extensive oil wells in the United States, in the middle of the nineteenth century, kerosene began to be used instead of whale, lard, and other oils. Many families found the Argand type of lamp rather expensive, and during the first half of the century, candles and crude lamps made of pewter continued in use. The twentieth century is preëminently the age of modern illumination, but there are many rural homes in America that still use the kerosene lamp for domestic lighting. A good lamp of this type gives a bright, clear light, but oil lamps require considerable labor on the part of the housewife. See next page.

Related Subjects. For supplementary information, the reader is referred to the following articles:

Candle and	Electric Light	Flame
Candle Power	Fire	Gas

LAMPBLACK, a fine carbon or soot, produced commercially by the imperfect combustion of such materials as coal or wood tar, pitch, petroleum, resin, etc. These substances are burned in brick furnaces or in cast-iron vessels; the dense smoke which results passes through a flue into the settling chambers, where the soot is deposited. Lampblack is used chiefly in the manufacture of lead pencils, paints, and printers' ink, for which purposes the crude product is satisfactory; for India ink, the purified soot is preferred. See CARBON; INK (India Ink); SOOT.

LAMPMAN, ARCHIBALD (1861-1899), a Canadian poet whose lyrics placed him in the front rank of nineteenth-century writers [see CANADIAN LITERATURE (English Canada)]. Un-



Old-Time Lamps. (1) Several specimens found in the Catacombs. (2) Terra cotta lamps from ancient Troy. (3) From the Mosque El-Ghuri, now in the museum at Cairo, Egypt. (4) Other lamps from Troy. (5) Very early specimens from Greece and Rome. In these lamps were rude wicks, and the resulting light was very feeble.

fortunately, his life was cut short when he was just beginning to win popularity. Lampman was born at Morpeth, Kent County, Ont., and was a descendant of United Empire Loyalists, of German extraction, who emigrated from Pennsylvania at the beginning of the Revolutionary War. Soon after his graduation (1882) from Trinity College, at Toronto, he entered the government service at Ottawa, and that city became his home. In his college days he had begun to write verses, but it was not until 1888 that he issued his first volume.

[Among the *Millet and Other Poems* and *Lyrics of Earth* are collections of his poems which appeared during his lifetime. After his untimely death, his friend and fellow-poet, Duncan Campbell Scott, edited a complete edition of his *Poems*.]

LAMPREY, an eel-like aquatic animal, with a long, slender body and smooth, scaleless skin. The mouth is a sucking organ, provided



THE LAMPREY

with horny teeth by which lampreys attach themselves to living fishes and rasp their flesh. They also feed on insects and worms. The *brook*, or *mud*, *lamprey*, about eight inches long and bluish-black, is found in lakes and brooks from New York to Minnesota and Kentucky. The *sea lamprey* of the European and Mediterranean coasts is dark brown in color, mottled with black, and attains a length of three feet. It follows the shad up the rivers to spawn in fresh water in the spring, returning to the sea in the autumn. A little blood poured into the water inhabited by lampreys soon attracts them to the spot, and they may then be caught in traps, like eels. Their flesh is eaten to a limited extent. L.H.

Classification. Modern scientists regard the lampreys as among the lowest vertebrate animals (see Zoölogy), and as occupying a place below the fishes in the zoölogical scheme. Lampreys possess a spinal column of fibrous nature and a *notochord*, but do not have a true vertebral column. They belong to the class *Cyclostomata* (see VERTEBRATES).

LANAI, *lah nah' e*, one of the islands of the Hawaiian group. See HAWAII.

LANCASTER, HOUSE OF, the name of the kingly line that ruled in England from 1399 to 1461, and again in 1470-1471. The name

originated during the reign of Henry III, who in 1267 conferred the title Earl of Lancaster on his second son, Edmund. On the failure of male heirs, John of Gaunt, fourth son of Edward III, married Blanche, the heiress of the House of Lancaster. Gaunt was created Duke of Lancaster in 1362, and at the same time his elder brother, Lionel, was created Duke of Clarence. In such manner originated the rival houses of Lancaster and York, whose emblems were, respectively, the red rose and the white rose.

In 1399, Henry of Lancaster, son of John of Gaunt, dethroned Richard II and became king as Henry IV, for, though his title was defective, his claim to the throne was accepted by Parliament. Henry was the first English king to rule by Parliamentary right. His successor, Henry V (1413-1422), maintained his position by winning the favor of Parliament and the Church, and by grace of his brilliant successes in the Hundred Years' War. The weak and inefficient Henry VI, who was deposed in 1461 and restored for a brief period in 1470, and whose troubled reign culminated in the Wars of the Roses, was the last representative of the Lancastrian line. Shakespeare gives a vivid picture of this period of English history in his *King Henry VI*.

Related Subjects. In connection with the above, see YORK, HOUSE OF, the rival of the Lancastrian line, and ROSES, WARS OF THE. See, also, HENRY (England).

LANCASTER, OHIO. See OHIO (back of map).

LANCASTER, PA., the county seat of Lancaster County, is an important commercial city and educational center in the southeastern part of the state. It is on Conestoga Creek, a tributary of the Susquehanna River, which flows along the western border of Lancaster County. Philadelphia is sixty-nine miles east; New York City is 159 miles northeast; and Harrisburg, the state capital, is thirty-six miles northwest. Population, 1928, 58,300 (Federal estimate).

Transportation. Lancaster is served by the Pennsylvania and the Philadelphia & Reading railroads. It is located on the Lincoln Highway, and is a radiating point for motor routes to Atlantic City, New England, the Pocono Mountains, Gettysburg Battlefield, Valley Forge, and other scenic and historic centers.

Industries. The city is situated in a rich agricultural region, in which the largest crops are wheat and tobacco. The cigar and tobacco manufactures are important. The city is noted for its manufacture of linoleums, Hamilton watches, umbrellas, parasols, and canes. A large hydroelectric power plant on the Susquehanna River at Holtwood, a few miles from the city, furnishes unlimited electricity for power and light.

Education. Lancaster is the seat of Franklin and Marshall College; Franklin and Marshall Academy; Shippen School for Girls; Sacred Heart and Saint

Mary's academies; Thaddeus Stevens Trade School; Theological Seminary of the Reformed Church in the United States; and Yeates Institute for Boys. In near-by towns are important schools: at Millersville is the oldest and largest normal school in the state; and at Lititz is the Moravian Seminary for girls, which is more than a century old.

History. The first permanent settlers, who came to the site in 1710, were Mennonites from the Palatinate or Swiss slopes. The place was incorporated as a borough in 1742, and received its charter as a city in 1818. In this old town lived Barbara Frietchie, whose birth certificate is still on record; and Peggy Shippen, wife of Benedict Arnold. Robert Fulton as a child played with his toy boats on the Conestoga River. James Buchanan, the only Pennsylvanian to become President of the United States; George Ross, signer of the Declaration of Independence and one of America's foremost patriots; and Thomas W. Evans, who made the practice of American dentistry famous at the court of Napoleon the Third and aided the Empress Eugénie in her flight to England after the fall of Sedan, all lived and worked in Lancaster, at some time in their lives.

F.W.N.

LANCELOT, *lan' se lot*, generally known as SIR LANCELOT DU LAC, one of the knights celebrated in the traditions and fables relating to King Arthur and the Round Table, as they found final shape in the *Morte d'Arthur* (1469) of Sir Thomas Malory. According to these, Lancelot was of royal birth. He was educated by the Lady of the Lake and was taken by her to Arthur's court, where he became one of the chief knights. His love for Guinevere, the

beautiful wife of Arthur, constituted the tragedy of Lancelot's life. He fought in many combats for her, always extricating himself with valor under the protection of the Lady of the Lake. When Guinevere entered the



LANCELOT AND GUINEVERE

sanctuary, he, too, was received into a cloister, thus giving up forever the hope of taking her away to the distant retreat of Joyeuse Garden. Upon the death of Guinevere, he was summoned to bury her beside the corpse of Arthur, and he soon followed her in death. Elaine, the beautiful maid of Astolat, loved Lancelot and died for her love. Lancelot is one of the chief characters of Tennyson's *Idylls of the King*, and the story of his love for Guinevere is the principal theme of the twelve books.

Related Subjects.

The reader is referred in these volumes to the following articles:

Arthur, King
Idylls of the King
Malory, Sir Thomas
Round Table

LANCEWOOD, the name of several tropical trees and their wood, which is of unusual tenacity and

elasticity. Because of these qualities, lancewood is much used for cabinetwork, surveyors' and fishing rods, carriage shafts, etc. Even the Deacon who built "the masterpiece" described in Holmes's *Wonderful One-Hoss Shay*—

Sent for lancewood to make the thills.

Lancewood is light yellow in color, and resembles boxwood.

G.M.S.

LANCIERS, *lahn' surz*, THE. See DANCING (Modern Dancing).

LAND, MARGINAL. See RENT.

LAND AND SEA BREEZES are the shore breezes which blow alternately from sea to land and from land to sea, in perpetually warm climates, and in temperate regions in summer.

During the day, as the land grows warmer, the air pressure becomes lower, and the air rushes in from the sea, which for the most part remains at the same temperature, and during the day is usually much cooler than the land. This breeze usually continues from noon into the night, when the land cools rapidly. The atmospheric conditions are then reversed; the warmer ocean, being the area of atmosphere of low pressure, receives the breeze from the cooler land. This breeze lasts until the middle of the morning, when it dies, and the calmer part of the day sets in, because the temperature of the land and the sea are about the same for several hours.

These breezes are sometimes noticeable ten miles inland, although a distance of two or three miles is as far as they usually penetrate. Land and sea breezes occur daily in the tropics, but are not invariable in temperate regions. Similar breezes blow on the shores of the Great Lakes. See WIND.

R.H.W.

LAND BANKS, FEDERAL. See RURAL CREDITS.

LAND CRAB, the name given to any sort of crab which lives on land in the mature state. Though living on dry land, these crabs breathe



LAND CRAB

by gills which are kept damp through means of a moisture chamber lined with a spongy membrane and covered by flaps of the shell of the thorax.

These strange looking crabs are found in the warmer countries of both hemispheres, burrowing beneath rocks, roots, or in sand during the day, and coming out only at night, except in rainy weather. All land crabs go to the water to mate and lay their eggs. The male crabs start the march and are followed in two or three days by the females. The large white crabs of Jamaica have an annoying habit of refusing to turn from their path and of walking straight through, or under, a house, where such a feat is possible. In tropical countries, the rattling of land crabs over the floor at night is a common sound. Several species are edible; in Jamaica they are a regular article of food for the natives, but are disliked by the whites.

S.H.S.

Scientific Names. Land crabs belong to the family *Gecarcinidae*. The black crab of the West Indies and the white crab of Jamaica belong to the genus *Gecarcinus*. Other genera are *Ocypoda* and *Cenobita*.

LAND-GRANT COLLEGES. See AGRICULTURAL EDUCATION.

LANDIS, KENESAW MOUNTAIN (1866-), a widely known jurist and public man. He was born in Millville, O., and was graduated at the Union College of Law, Chicago, in 1891. Landis was private secretary to Walter Q. Gresham, Secretary of State between 1893 and 1895, after which he became a practicing attorney. In 1905 he was nominated by Theodore Roosevelt to the post of United States District Judge for the Northern District of Illinois. This position he resigned in 1922 to accept appointment as high commissioner of baseball, at a salary which permitted him to build up a comfortable private fortune.

As district judge, Landis acquired an international reputation. Of unimpeachable integrity, fiery in denunciation of sharp practices, a hard worker, he was probably quoted more widely than any other jurist of the period. In a case against the Standard Oil Company, charged with accepting rebates, he assessed fines aggregating \$29,200,000; this decision, however, was overturned later by the Supreme Court. In civic affairs he also took a prominent part; in 1921 he was arbiter of disputes in the Chicago building trades, and fixed a scale of wages for all classes of labor, which became standardized as the Landis Award. See BASEBALL (Organized Baseball).

LANDLORD AND TENANT. See LEASE; TENANT.

LAND OFFICE. See LANDS, PUBLIC.

LAND OF ICE AND FIRE. See ICELAND.

LAND OF STEADY HABITS, a nickname for Connecticut (which see).

LAND OF THE MIDNIGHT SUN. See NORWAY.

LAND OF THE WHITE ELEPHANT, a romantic name applied to Siam (which see).

"LAND OF WOODEN NUTMEGS." See NUTMEG; CONNECTICUT.

LANDOR, WALTER SAVAGE (1775-1864), a graceful and forceful English writer, whose fame rests chiefly on his *Imaginary Conversations*, a series of dialogues between ancient and modern celebrities. He studied at Rugby and Oxford, but was expelled from both institutions for unruliness. He published a small volume of poems in 1795, and a long poem, *Gebir*, in 1798. The latter was afterward translated into Latin.

Representative Works. Among Landor's other poetical works are *Simonides*, *Count Julian*, *Hellenics*, and *Collected Poems*. His prose works include *Pericles and Aspasia*, *The Last Fruit off an Old Tree*, and *Dry Sticks Fagoted*.

LANDS, PUBLIC, IN THE UNITED STATES. Parts of the national domain still under the ownership and control of the government, but held for future sale or other disposal, are called *public lands*. Literally, the term includes all lands owned by the government; in common use, however, it is applied only to land intended for development or settlement, and not to forest reserves and other restricted areas.

History of American Acquisitions. The public lands of the United States were acquired by cessions from the states and by purchase and conquest from the Indians and from foreign nations. In 1781, when the Confederation was organized, the new government found itself the owner of New York's claim to certain lands between the Allegheny Mountains and the Mississippi River. Between that date and 1802, when Georgia relinquished its claims, all the Atlantic coast states surrendered to the national government the lands stretching westward to which they had laid claim under their colonial charters. Connecticut and several other states reserved a few sections for the assistance of the Revolutionary War veterans and for similar purposes, but these areas were comparatively small. In 1803 the national domain was doubled by the Louisiana Purchase, which added more than 1,000,000 square miles, if Oregon is included. Sixteen years later, in 1819, 60,000 square miles were secured by the purchase of Florida from Spain. The annexation of Texas in 1845, the Mexican cessions in 1848, and the Gadsden Purchase of 1853 rounded out the territory of the United States proper to its present boundaries.

After the territory of states and foreign nations was thus acquired, there still remained to be settled the rights of those who had the best claim to the land—the Indians. As the settlements of the white men spread westward, the Indians were forced to move ahead of them in the same direction. Usually, the government purchased the Indian lands, and offered in exchange lands farther west. Even in the West, the Indians did not find permanency; many of their reservations have one by one been taken over by the government and thrown open to settlement, though the government has given financial compensation.

Disposal of Public Lands. The United States has, from time to time, disposed of public lands of a total estimated area approaching one billion (1,000,000,000) acres, or nearly half the total area of the country. The policies which have governed the distribution of these vast tracts have changed frequently, but it is possible to summarize them. The first plan was to make the lands yield a revenue—in the words of Alexander Hamilton, “to effect a gradual discharge of the domestic debt, and

furnish liberal tributes to the Federal Treasury.” As the country grew richer, two other purposes became prominent: to induce settlement of the lands and to provide funds for public purposes which would have placed too great a burden on the people if paid by taxation. To encourage settlement, large tracts were first sold to land companies, notably in Ohio and Kentucky, the companies agreeing to secure settlers. Later, land was sold in small lots, occasionally on credit, to individual settlers. The credit system was abolished in 1820, and thereafter land was sold for cash in areas as small as eighty acres, for \$1.25 an acre. After 1837, when a panic ended the boom in Western lands, the *preemption* system was introduced, and in 1862 the first of the *homestead laws* was passed.

In the early days of the republic, and indeed until a decade after the War of Secession, large areas were granted to individuals as a reward for distinguished services to the nation. Nearly 10,000,000 acres were given to veterans of the Revolution and the War of 1812, and about 60,000,000 acres were set aside for soldiers who had taken part in the Mexican War. Millions of acres were also granted at various times to corporations engaged in building roads, canals, and railways. The construction of the Illinois Central and the Pacific railways was made possible by the grant of nearly 200,000,000 acres; from the sale of these lands the railroads have added greatly to their income, but in the beginning they could not have been built without such assistance. In 1902 Congress passed the Reclamation Act, which set aside all money received from the sale of public land in sixteen of the Western arid or semi-arid states, as a special fund for the construction and operation of irrigation systems.

Perhaps the most important of all land gifts have been those to the states to encourage education. All states admitted to the Union before 1850 received one thirty-sixth of their area—one section in each township—as a foundation for a school fund. Those admitted after 1850 received two sections in each township. The land thus granted—about 75,000,000 acres—is a small fraction of the total granted in other ways, but it has been the means of providing each new state with future revenue to establish and assist in maintaining its public-school system. Each state on its admission has also received a tract of from one to four townships to create a fund for a state university, and by the Morrill Act of 1862, it also receives an area proportionate to its representation in Congress as a subsidy or endowment for an agricultural college. These additional gifts have involved about 10,000,000 acres.

Remaining Public Lands. Though much of the public land has thus been granted or sold,

large sections still remain, chiefly in the West. The following table gives the areas still unappropriated and available for settlement:

STATE OR TERRITORY	AREA UNAPPROPRIATED AND UNPRESERVED		
	Surveyed	Unsurveyed	Total
	Acres	Acres	Acres
Alabama.....	30,020	2,240	32,260
Arizona.....	8,978,665	9,112,046	18,090,711
Arkansas.....	221,316		221,316
California.....	14,951,844	5,715,587	20,667,431
Colorado.....	6,437,997	960,410	7,398,407
Florida.....	3,418	1,040	4,458
Idaho.....	8,876,277	2,114,193	10,990,470
Louisiana.....	9,597		9,597
Minnesota.....	250,250		250,656
Montana.....	6,426,824	270,100	6,696,924
Nebraska.....	32,611		32,611
Nevada.....	31,184,663	22,741,030	53,925,693
New Mexico.....	14,783,889	1,615,142	16,399,031
North Dakota.....	133,237		133,237
Oklahoma.....	28,772		28,772
Oregon.....	13,050,967	205,463	13,256,430
South Dakota.....	300,956		300,956
Utah.....	13,411,358	13,460,860	26,872,218
Washington.....	886,783	9,424	896,207
Wyoming.....	19,138,284	711,478	19,849,762
Grand Total...	139,137,734	56,919,013	196,056,747

Management of Public Lands. The administration of the public domain is the work of the General Land Office, a bureau in the Department of the Interior. At its head is the Commissioner of Public Lands, who is appointed by the President and receives an annual salary of \$7,500. The Commissioner is responsible for the surveying and sale of lands, and for all documents and records in connection with them. He reports annually to Congress, and issues maps and circulars of information to the public. In each state where the area of the public lands exceeds 100,000 acres

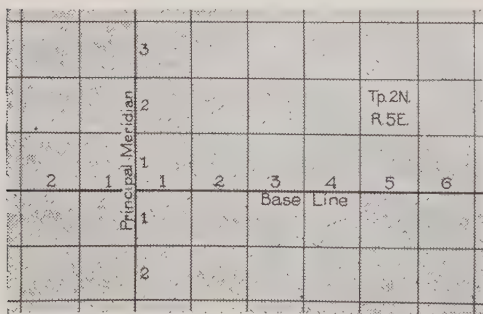


DIAGRAM OF TOWNSHIP AND RANGES

there are local Federal land offices, in charge of a register and a receiver, both appointed by the President. The register receives applications for land, and when the final payments

have been made, issues a certificate entitling the owner to a deed, or patent, from the United States. The patents are issued by the General Land Office in Washington and are signed by the recorder and the secretary. All decisions of the local receivers or registers are subject to final approval by the Commissioner.

Ranges, Townships, and Sections. When public lands are surveyed, they are divided like a checkerboard into townships six miles square. Each township contains thirty-six sections of one square mile each, or 640 acres. The sections are subdivided into quarter-sections of 160 acres, and into lower units.

For purposes of description, all townships in a north-and-south line are said to be in a *range*. Certain of the

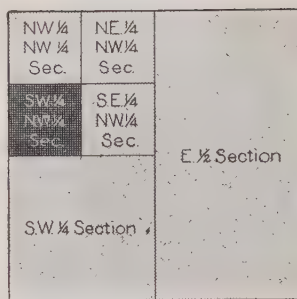
meridians of longitude are called *principal meridians*, and certain of the parallels of latitude are named as *base lines*. If a township is the second one north of a base line in the fifth range east of the principal meridian, it is described as *Township two north, range five east*, as shown on the first diagram below. The description *SW 1/4 NW 1/4 Sec. 9, Tp. 2 N R 5 E 2* refers to the forty-acre tract shown in black in the diagrams; it means the southwest quarter of the northwest quarter of section nine, in township two north, in range five east of the second principal meridian.

Related Subjects. The reader is referred in these volumes to the following articles:

Florida (History)
Forest and Forestry
Gadsden Purchase
Homestead Laws
Indians, American
(Reservations)

Irrigation
Louisiana Purchase
Mexican War (Results)
Preemption
Texas (Annexation)

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

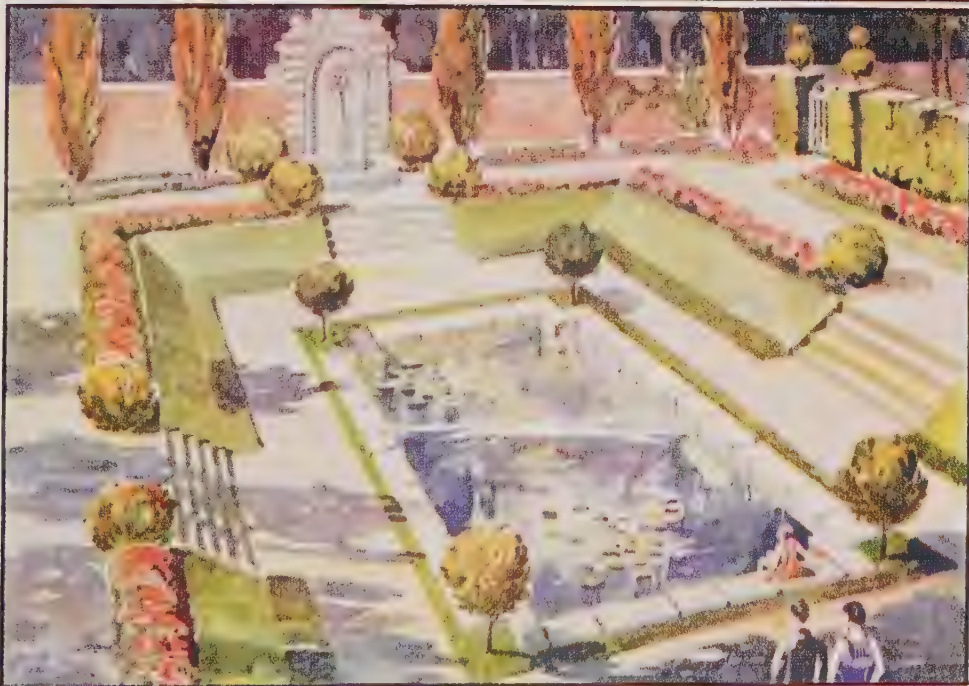


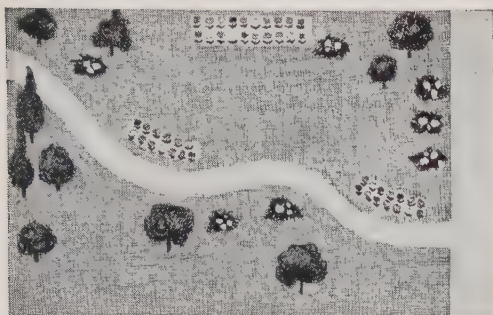
HOW TO LOCATE A FARM

The upper diagram shows a regularly laid-out township of thirty-six square miles, or sections, each containing 640 acres. The lower diagram represents in enlarged form section nine of the upper. How many acres in this SW 1/4 of the NW 1/4?

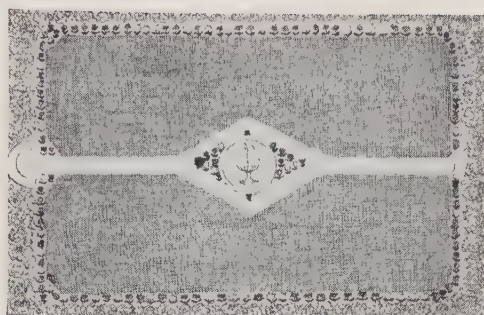
LANDSCAPE GARDENING, OR LANDSCAPE ARCHITECTURE, the skilful changing of the natural surroundings of any place so

INFORMAL *and* FORMAL GARDEN





AN INFORMAL GARDEN



ON FORMAL LINES

as to produce the most artistic results. The architect may build a beautiful house, but if it is in the midst of a barren prairie, the effect is not pleasing. The gardener, with no regard for a pleasing effect of unity, may lay out his grounds according to a plan which totally disregards the house or its surroundings. It is the business of the landscape gardener or landscape architect to create a harmony in the landscape. If the architect has built a house which seems out of place, the landscape architect should change the surroundings so that the building seems a part of the landscape. The work of an artist in landscape gardening is essentially like that of the landscape painter, for both deal with perspective, mass, shadow, and other principles. The painter, however, is handicapped, for he only creates a counterfeit in two dimensions, whereas the landscape gardener evolves the picture in three dimensions. The gardener actually puts a hedge, a tree, a flower bed, or a fountain where he thinks it looks best, but the painter can only reproduce it on a flat surface.

Landscape gardeners are concerned not merely with small houses in cities, but with country homes, both large and small, with parks, playgrounds, cemeteries, and expositions. The landscape gardening at the World's Columbian Exposition, held in Chicago in 1893, set a standard for work on a large scale which has never been surpassed. It was the achievement of Frederick Law Olmsted, whose father is generally regarded as the founder of landscape gardening in America. The work of Jules Guerin, director of color and decoration at the Panama-Pacific Exposition at San Francisco in 1915, was perhaps equally notable. The modern garden cemeteries, which are so characteristically a product of America, are other examples of landscape gardening at its best. In its largest field, landscape gardening is closely allied to, and is, in fact, a branch of, city planning.

Landscape gardening to-day is divided into two distinct styles, one formal, the other informal. Formal landscape gardening attempts to improve Nature's work by making it regu-

lar. In formal gardening, geometric figures are used as a basis. Gardens are laid out in regular shapes, squares, circles, ovals, and balanced figures. The second sketch above shows a typical estate laid out on formal lines. The English, or natural, style, on the other hand, is informal. It, too, attempts to improve Nature's work, but it uses no fixed patterns. Its highest achievement is to make a landscape look natural.

In the natural style, which in America has now almost entirely supplanted the formal or artificial method, straight lines, sharp angles or curves, and elaborate patterns are avoided. Walks are irregular and winding, and groups of trees, flowers, and shrubs are placed at intervals, as if Nature herself had carelessly planted them there. Formal gardening is best suited to confined or small spaces, and is usually out of keeping with the vast stretches of great private estates or public parks; but the natural style is suitable for both large and small estates. The first sketch above shows a simple garden arranged on quite informal lines. See GARDENING; CITY PLANNING (Garden Cities).

LANDSEER, SIR EDWIN HENRY (1802-1873), an English painter, distinguished for his pictures of animals. Dogs and deer were his favorite subjects, and he painted them with such skill and feeling that they stand out from his canvases almost as if alive. Landseer's artistic career falls into two periods, one of which began in early youth. His father, John Landseer, a London engraver and writer on art, early discovered the lad's skill in drawing animals, and trained him to sketch them accurately from life. At the age of five, the boy drew fairly well, and before he was ten, proved himself an excellent draughtsman. When thirteen years of age, Landseer first exhibited at the Royal Academy, and at fifteen he was already famous and had more commissions for work than he could possibly carry out. The painting which brought him prominently before the general public was his *Fighting Dogs Getting Wind*, exhibited in 1818. This picture, generally regarded as the masterpiece of his

boyhood, is perfectly drawn, and finished with a minuteness which is almost photographic.

Until about 1823, Landseer was satisfied to draw animals as they were, merely reproducing their natural expression and character. Dur-

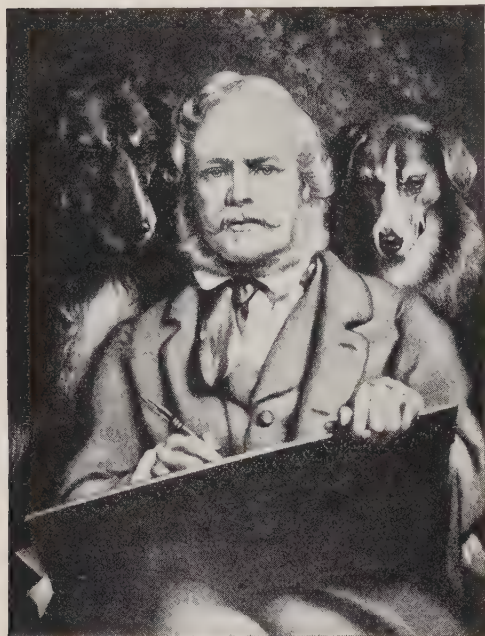


Photo: Brown Bros.

EDWIN HENRY LANDSEER

ing the second period of his long career, he constantly attempted, usually with remarkable success, to associate human sentiments with them. He worked with amazing rapidity, turning out finished sketches in a few hours, and in the course of his lifetime, he finished thousands of paintings. His work won general recognition; he was elected to the Royal Academy, was knighted in 1850, and was paid enormous fees. Part of the popularity of his paintings was due to their carefully chosen names, which frequently attributed qualities of humor or pathos to their subjects. Many of them were reproduced by his brother Thomas (1795-1880) in the form of steel engravings.

The chief strength of Landseer's style was in the combining of fine technical skill and vigorous sentiment. He also possessed the originality which is the mark of the true artist.

Representative Works. Many admirers feel that Landseer's best work is *Suspense*, which shows a dog watching at the closed door of his wounded master. *The Old Shepherd's Chief Mourner* is another favorite, as are also *A Distinguished Member of the Humane Society*; *The Cat's Paw*; *High Life and Low Life*; *The Illicit Whisky Still*; *The Monarch of the Glen*, a splendid buck against a background of mountains; *The Stag at Bay*, cornered by a wolf; and *Eos*, a portrait of the Prince Consort's favorite greyhound. *The*

Connoisseurs is a portrait of himself and his two favorite dogs. See illustration in article *STAG*.

LAND'S END, a cape in Cornwall, the westernmost point of England, which marks the entrance to the English Channel from the Atlantic Ocean, and is the last point of land seen by voyagers out of the Channel when steaming toward North America. It ends in granite cliffs, sixty to a hundred feet high, fantastically carved by the water. Dangerous reefs lie off the coast, one rocky islet being marked by the Longships lighthouse, a mile from the mainland.

LAND SETTLEMENT ACT. See *SCOTLAND* (Agriculture).

LANDSMAAL, *lahns' mawl*. See *NORWAY* (Language and Literature).

LANDSTING, *lahns' ting*, the upper house of the Danish Rigsdag and a provincial council of Sweden. See *DENMARK* (Government); *SWEDEN* (Government).

LANDSTURM, *lahnt' stoorm*. See *ARMY* (Armies of the World: German Army).

LANDTAG, *lahnt' tahk*, upper house of the Norwegian Storting. See *NORWAY* (Government).

LANDWEHR, *lahnt' vare*. See *ARMY* (Armies of the World: German Army).

LANE, FRANKLIN KNIGHT (1864-1921). See *FLAG*, for quotation.

LANFRANC, *lan' frangk* (?1005-1089), a churchman and scholar and the first archbishop of Canterbury after the Norman Conquest. He was born at Pavia, Italy, studied law in his native city, and in 1039, in the hope of achieving greater distinction, went to France. There he founded a school of law at Avranches, Normandy, which soon became widely known throughout Europe. In 1042 he entered the Benedictine monastery at Bec, of which he was prior from 1045 to 1066. As a reward for obtaining the Papal consent to the marriage of William of Normandy to his cousin, Lanfranc was appointed abbot of a new monastery at Caen, in 1066. Following William's conquest of England, Lanfranc was appointed by him in 1070 to the archbishopric of Canterbury. He acted as regent of the kingdom during William's absence from the country, and played an important part in religious and civil affairs.

[Lanfranc's writings include *Commentaries on the Epistles of Saint Paul*, *A Treatise Against Berenger*, and some interesting sermons and letters.]

LANG, ANDREW (1844-1912), a versatile writer who did many things well, but who produced no single work of outstanding merit. He was born in Selkirk, Scotland, and educated at Edinburgh Academy, Saint Andrew's University, and Balliol College, Oxford. Lang collaborated with Professor Butcher on an excellent version of the *Odyssey*, and made other contributions to the study of compara-

tive mythology and religion in *Custom and Myth*; *Myth, Ritual, and Religion*; *Secret of the Totem*; and *The Clyde Mystery*. He also published several volumes of ballads, biography, history, translations, and fairy tales.

Other Works. These include *Letters on Literature*; *Homer and the Epic*; *A Defense of Sir Walter Scott and the Border Minstrelsy*; *Shakespeare, Bacon, and The Great Unknown*; and *Letters to Dead Authors*.

LANGEN, EUGENE, inventor of the monorail railroad. See **MONORAIL**, **SUSPENDED**.

LANGLAND, WILLIAM (?1332-1400), with the exception of Chaucer, the greatest English poet of the fourteenth century. He was probably the author of *The Vision of Piers Plowman*, a great satirical allegory, vigorously attacking Church and State corruption; and of *Richard the Redeless*, dealing with the life of Richard II. Very little is known of Langland's life. Supposedly, he was born in Shropshire and studied with the Benedictine monks; later, he drifted to London, where he lived in poverty. See **ENGLISH LITERATURE** (*The Age of Chaucer*).

LANGLEY, SAMUEL PIERPONT (1834-1906), an American astronomer, physicist, and pioneer in aeronautics. He invented the bolometer, the most delicate instrument for recording solar heat, capable of detecting a variation of less than one-millionth of a degree. Langley was born at Roxbury, Mass., and was educated at the Boston Latin School. In 1865, after a period of study in Europe, he was appointed professor of mathematics in the United States Naval Academy at Annapolis, later becoming professor of astronomy at the Western University of Pennsylvania, and secretary of the Smithsonian Institution in 1887. He established the Astrophysical Observatory and the National Zoological Park at Washington, became in 1886 president of the American Association



Photo: Brown Bros.

ANDREW LANG



Photo: Brown Bros.

SAMUEL P. LANGLEY

for the Advancement of Science, and received from Oxford University the degree of D.C.L., the Janssen medal of the Institute of France, and the Rumford medal of the Royal Society, of London.

The First Flying Machine. Three successful flights of half a mile having been made by power-driven models of Langley's construction, in 1896, Congress granted him \$50,000 to build a man-carrying aerodrome (as he called his airplane). But he met with ill success and finally abandoned the experiments for lack of funds. His last machine was generally called "Langley's Folly." On February 27, 1906, heartbroken, it is said, at the failure of his experiments, he died. His genius has been vindicated, however, for in June, 1914, Glenn Curtiss accomplished one or more flights in the machine on which Langley had placed his hopes. That machine is now preserved in the Smithsonian Institution, Washington, D. C. See **AIRCRAFT** (*Heavier than Air*).

LANGSHAN. See **POULTRY**, table of classes.

LANGSTON, STEPHEN CARDINAL (? - 1228), archbishop of Canterbury and a cardinal of the Roman Catholic Church. He was the center of a dispute over the election to the Canterbury see, and he sided with the barons against King John. The Pope upheld the king and excommunicated the barons, but Langston refused to publish the decree, for which he was suspended for two years. After his reinstatement to Canterbury, in 1218, he engaged in religious and political reforms in England until his death.

LANGTRY, LILLIE (1852-1929), an English actress, known as the *Jersey Lily* on account of her beauty, was born on Jersey, one of the Channel Islands. Her maiden name was LILLIE LE BRETON, and she was the daughter of a clergyman of the Church of England. In 1874 she was married to Edward Langtry, and in 1881 made her first stage appearance in London, in *She Stoops to Conquer*. In the following year she visited America, and was enthusiastically received, more perhaps on account of her physical attractions than for her ability as an actress. In 1899, two years after the death of her husband, she married Sir Hugo Gerald de Bathe. In 1903 she returned to America and starred in *The Crossways*, a play written by her in collaboration with J. Hartley Manners (died 1928). She again visited the United States in 1912, appearing in vaudeville.



Photo: Brown Bros.

LILLIE LANGTRY



LANGUAGE, *lan' gwaje*. Men, birds, and the animals have various ways of communicating with others of their own kind. In one sense, all these means of communication may be called *language*, but in the ordinary sense in which the term is used, language means the spoken word of man. Every nation and every tribe has its language, and there are at least 2,500 spoken languages in the world. Some of these, especially the languages of barbarous tribes, include a comparatively small number of words, and are spoken by a limited number of people. Unless a language has been reduced to writing, it has not been systematized, nor can its development be traced from any standard basis. In such circumstances it is a "grammarless tongue."

Languages are usually classified under groups called *families*. Two of these families are most important, because of the place in history and literature of the people speaking them; they are the *Indo-European* family, which includes most of the languages spoken in Europe and America (excluding the Indian languages) and some of the languages of Asia, especially those of India; and the *Semitic* family, which includes the languages of the Hebrews, Arabs, Abyssinians, Assyrians, Phoenicians, and Syrians. The Chinese language belongs to a separate family called the *South-eastern Asiatic*; the Turkish, Finnish, and Hungarian languages belong to one called the *Ural-Altaic*. More than 150 African languages belong to a separate family called the *South African*, or *Bantu*, and there are other families of lesser importance, whose languages do not belong, apparently, to any of these other families.

Origin of Language. Many theories have been advanced to account for the origin of language, but all of them must be speculative. We may trace a modern language back to the unnamed language from which all of the great Indo-European group sprang. Back of that, we have made no certain discoveries. We must proceed with only our reason, based on what we know of man's bodily and mental development, and our knowledge of the developments of the languages whose history we can trace.

It is generally believed that man's utterances of sound to express pleasure or pain were the initial steps in the development of language. These speech sounds, with the aid of gestures, expressed his thoughts and wishes; some scholars believe that gesture was used long before any significance was attached to sound. These sound combinations, some of which were quite complex, gradually acquired stability and became words and then sentences. All of these steps in progress are studied in the science of language called *philology*. However language may have developed throughout the ages as a medium of expression and communication, it has been the means of recording the history of races, and gives us a way to measure their development.

Steps in the Study of Language

The person who can use the mother tongue fluently, accurately, and effectively in the expression of his thought has a power and a possession that will serve him at every turn.

—From a *State Course of Study*.

The importance of the study of English cannot be overemphasized. In the primary grades, all the activities of the child's mind should be made to contribute to the strengthening of his power of expression through language. "Every lesson is a lesson in language," is a principle which must be regarded, for in each lesson a child must express his thoughts either in speech or in writing. While wrong forms of expression may be corrected and correct expression emphasized in every class, the teacher cannot make each class a drill period in language, lest nothing else be learned. Therefore, language study is a part of the school work of every grade. The following outline of materials and methods is offered to supplement any regular course of study. The chief purposes of the suggestions are to set forth the underlying principles upon which the teaching of the English language rests, and to call attention to the language facts upon which special stress should be placed in both the home and the school.

Underlying Principles. The following underlying principles are applicable to all language

teaching, and they will be referred to as occasion requires in the pages that follow:

1. *The child learns language by listening to his parents.*

The first impressions of speech are the most important, and if the child hears correct pronunciation, grammatical speech, and well-modulated voices at home, he will form correct speech habits from his first years.

2. *The child learns language from literature and song.*

The child who is taught the nursery rhymes of Mother Goose and other children's favorites, and who listens to the lullabies of childhood, unconsciously lays the foundation of a good literary taste. "It is the ear and not the script or print," says Chubb, "that is the first, as it is the final, arbiter and nurse of all lovely speech and song."

3. *The child learns language by listening to his associates.*

The playground and the street are the great sources of discouragement to the teacher of language and to cultured parents. Some advocate excluding the child from these influences to prevent the corruption of his speech. But character is developed only through contact with one's fellows, and there is great danger that the child will lose more than he will gain by such exclusion. The difficulty to be overcome is not, however, as great as it at first seems, provided the early home training has been of the sort described above. The child who has formed right habits of speech in the home, and who is encouraged to use them, will slough off the bad forms learned in the street just as he outgrows many other childish habits in the progress of his natural development, unless, by repeated cautions not to use these expressions, they are kept before him.

4. *Language is only one means, and often a limited means, of expression. Its usefulness is increased by the development of other means, such as gesture, drawing, and construction work.*

5. *Language and thought supplement each other.*

The language the child learns affects his thought and is a strong factor in the development of his character. In the language of the poet—

This price the gods exact for song,—
That we become just what we sing.

It naturally follows that only the best in language and literature should be presented to children.

Language Work in the Home. Because the foundation of language is laid in the home, we reiterate the first principle: *The child learns language by listening to his parents.* To this we wish to add another truth of almost equal importance: *Early habits may be overcome, but they are seldom, if ever, forgotten.* What are

the *parents'* duties in leading the child to take his first steps in talking?

1. *To pronounce words correctly.* Since the child will reproduce what he hears, care should be exercised in pronouncing all words ending in *ing*, as *making*, *walking*; and such words as *been*, *sir*, *sure*, etc.

2. *To use correct language forms*, as *Whom did you see?* He *did* the work yesterday; I *saw* John last week; I *have* no money. Many people violate the rules of speech daily in such sentences as are given above, usually through carelessness. Their practice is not on a par with their knowledge. If the child hears these violations in the home, he will use them, believing that they are correct, and when the wrong forms are once learned, it is difficult to eradicate them.

3. *To avoid "baby talk."* Perhaps no other practice in the home does so much to corrupt the child's speech as indulging in the "*tootsie wootsie, little manny*" talk in which many good people take delight. Those who consider the child's welfare will refrain from such expressions, once they realize their influence upon his language.

4. *To encourage the child to talk.* The child will talk all his life, and he should be taught at once to express himself simply and correctly. Children like to talk, but their chatter is too often suppressed by those who dislike to be "bothered." If simple words are used in conversation with the child, he will soon learn them, and will use them in his conversation.

5. *To teach the child good literature.* A college professor once claimed that he could pick out his students who had learned *Mother Goose* melodies in childhood, by their use of language. Be this as it may, the value of the nursery rhyme, the nonsense jingle, and the classic myth in laying the foundation of language is universally recognized. And unless these are taught in the early years when they appeal to the child's mind, their influence will never be felt. Here are a few selections that every child should learn before his fifth year. These selections should be taught incidentally as part of the child's play:

Little fishie in the brook,
Papa caught him with a hook,
Mamma fried him in a pan,
Baby ate him like a man!

Bye, baby bunting,
Father's gone a-hunting,
Mother's gone a-milking,
Sister's gone a-silking,
Brother's gone to buy a skin
To wrap the baby bunting in.

Pat-a-cake, pat-a-cake, baker's man,
Make me a cake as fast as you can;
Prick it and pat it and mark it with T,
And put it in the oven for Teddy and me.



HUMPTY DUMPTY

Humpty Dumpty sat on a wall;
 Humpty Dumpty had a great fall,
 And all the King's horses and all the King's men
 Can't put Humpty Dumpty together again.



DING, DONG, BELL

Ding, dong, bell,
 Pussy's in the well!
 Who put her in?
 Little Tommy Linn.
 Who pulled her out?
 Big John Stout.



ROCK-A-BYE, BABY

Rock-a-bye, baby, in the tree top;
 When the wind blows, the cradle will rock;
 When the bough breaks, the cradle will fall;
 Down will come baby, cradle, and all.

Little Boy Blue, come blow your horn;
 The sheep's in the meadow, the cow's in the corn.
 Where's the little boy that looks after the sheep?
 He's under the haystack, fast asleep.



OLD KING COLE

Old King Cole
 Was a merry old soul
 And a merry old soul was he;
 He called for his pipe,
 And he called for his bowl,
 And he called for his fiddlers three.
 Every fiddler he had a fiddle,
 And a very fine fiddle had he;
 Twee, tweelee dee, tweelee dee,
 Went the fiddlers three.
 O! there's none so rare as can compare
 With King Cole and his fiddlers three.



TWINKLE, TWINKLE, LITTLE STAR

Twinkle, twinkle, little star;
 How I wonder what you are!
 Up above the world so high,
 Like a diamond in the sky.

When the glorious sun is set,
 When the grass with dew is wet,
 Then you show your little light,
 Twinkle, twinkle, all the night.

In the dark-blue sky you keep,
 And often through my curtains peep;
 For you never shut your eye
 Till the sun is in the sky.

As your bright and tiny spark
 Lights the traveler in the dark,
 Though I know not what you are,
 Twinkle, twinkle, little star!

6. *To cooperate with the teacher.* After the child enters school, the language training at home should be planned to fix in mind the lessons taught at school. In teaching all nursery rhymes and other selections, care should be taken to teach them correctly. Many books contain versions that differ widely from the original.

First Year. The child has the foundation for language when he enters school, at five or six years of age. If he has had careful home

training, there should be no break between the work of the home and that of the school. Moreover, the work for the first year should be planned with a view to the work of the succeeding grades, so there will be no abrupt change in the language lessons as the pupil passes from one grade to another.

"All activities of the child may be made tributary to his training in English, since he is always doing something and telling about it." During the first year, the work will be essentially oral. The teacher will be expected to follow the prescribed course of study, but the pupils should receive drill on the following points:

1. *Conversation Lessons.* "The teacher's prime duty is to make beautiful speech attractive." To this end, children must be trained to talk, and that the desired results may be secured, they must be made to feel so much at home that their speech will be spontaneous and natural. The creation of a homelike atmosphere in the schoolroom is essential to successful language lessons. If the teacher is natural and spontaneous, the pupils will follow her example.

The activities in the home, the stories the children know and those the teacher tells them, the birds, some of the common insects, simple flowers and plants, the reading lessons, the games the children play, and many other common experiences and pictures, may be drawn on for material for these lessons. The chief aim is to make good talkers—that is, so to guide the children that they will gain the power to tell what they know, naturally and in logical sequence, and to express themselves in good English.

The child must have something to say, as well as a desire to say it. For that reason, all conversation lessons during the first and second years should be rich in content. The teacher should encourage the pupils to observe the objects about them closely, and to tell about them carefully. Before the lessons on any subject are dropped for something else, each pupil should tell what he has learned, in as complete a story as possible. Riddles and guessing games involving careful description of objects are interesting variations in oral work.

The nursery rhymes, stories, and myths that the children have learned serve as excellent material for connecting the home with the school, since the pupils will be eager to tell what they know. These should be supplemented by many others during the year. The teacher should therefore be a good story-teller (see *STORY-TELLING*).

The most difficult task that confronts the teacher is that of securing correct forms of expression without suppressing the pupil's spontaneity. Criticism is necessary, but it must be

given tactfully. The teacher who solves this problem successfully will solve without difficulty all other problems connected with her language work. The following suggestions will be found helpful:

(a) Be careful to use correct language. The pupils imitate your speech as well as your actions.

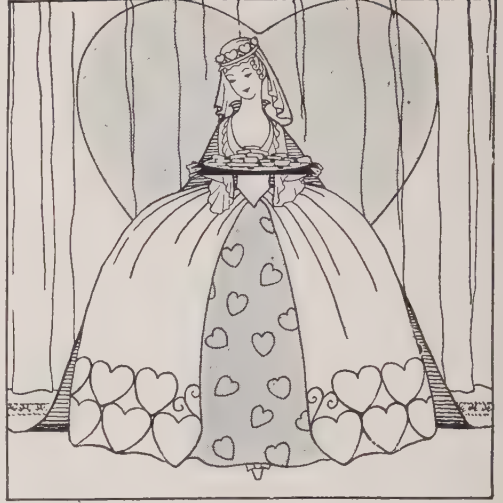
(b) Emphasize correct forms by calling attention to them in such a way as not to embarrass the pupil. Ignore incorrect forms by not calling attention to them. Your criticism should always be of such a nature as to lead the pupil to feel that you are helping him to say what he wants to tell, in a better way.

2. *Reading.* Since this subject is discussed under its title, it is not necessary to give it space here further than to state that the reading lessons are vitally connected with the language lessons, and that they furnish much valuable material for language work.

3. *Written Work.* The child is always interested in doing something new, and sometime during the first year, the pupils should begin to write. Since writing is a form of expression, the writing exercises are closely related to the language lessons; when the pupils have had enough practice in writing to enable them to write two or more words, they may occasionally be called upon to write short statements, as, *I saw a robin*. But the tendency is to introduce written exercises too early. Until the pupil has mastered the mechanics of writing, the act requires so much attention that it is impossible for him to express his thought. During the first year, written exercises should be very brief, consisting at first of not more than one or two sentences. They may be increased in length toward the end of the year.

4. *Dramatization.* Children like to "act out" their stories and the little dramas that can easily be constructed out of such fables as *The Wind and the Sun* and *The Lion and the Mouse*, such poems as *Old King Cole* and *Queen of Hearts*, and many simple stories. These exercises keep the pupils interested and also serve to strengthen their powers of expression. See DRAMA.

5. *Material.* The best primers and first readers contain material of high literary value, but, unfortunately, many books of poems and prose selections for children, and some of the educational journals, publish material for language and reading work that is decidedly below the standard approved by the best educators. Selections for memorizing and stories to be read or told to the pupils should be selected with the greatest care. When we have the works of the masters to draw upon, why seek inferior sources? The selections that follow are given as illustrations of the sort of material that should be selected:



THE QUEEN OF HEARTS

The Queen of Hearts,
She made some tarts
All on a summer's day:
The Knave of Hearts,
He stole those tarts,
And took them clean away.

The King of Hearts,
Called for the tarts,
And beat the Knave full sore:
The Knave of Hearts
Brought back the tarts,
And vowed he'd steal no more.



THE SWING

The Swing

ROBERT LOUIS STEVENSON

How do you like to go up in a swing,
Up in the air so blue?
Oh, I do think it the pleasantest thing
Ever a child can do!

Up in the air and over the wall,
Till I can see so wide,
Rivers and trees and cattle and all
Over the countryside—

Till I look down on the garden green,
Down on the roof so brown—
Up in the air I go flying again,
Up in the air and down!

What Does Little Birdie Say?

ALFRED TENNYSON

What does little birdie say,
In her nest at peep of day?
"Let me fly," says little birdie,
"Mother, let me fly away."
Birdie, rest a little longer,
Till the little wings are stronger.
So she rests a little longer,
Then she flies away.

What does little baby say,
In her bed at peep of day?
Baby says, like little birdie,
"Let me rise and fly away."
Baby, sleep a little longer,
Till the little limbs are stronger.
If she sleeps a little longer
Baby, too, shall fly away.

Seven Times One

JEAN INGELOW

There's no dew left on the daisies and clover,
There's no rain left in heaven:
I've said my "seven times" over and over,
Seven times one are seven.

I am old, so old I can write a letter;
My birthday lessons are done;
The lambs play always, they know no better;
They are only one times one.

O moon! in the night I have seen you sailing
And shining so round and low;
You were bright! ah, bright; but your light is failing—
You are nothing now but a bow.

You moon, have you done something wrong in heaven
That God has hidden your face?
I hope, if you have, you will soon be forgiven,
And shine again in your place.

O velvet bee, you're a dusty fellow,
You've powdered your legs with gold!
O brave marsh marybuds, rich and yellow,
Give me your money to hold.

O columbine, open your folded wrapper,
Where two twin turtle-doves dwell!
O cuckoo-pint, toll me the purple clapper
That hangs in your clear green bell!

And show me your nest with the young ones in it;
I will not steal them away;
I am old! you may trust me, linnet, linnet—
I am seven times one to-day.

The Fox and the Crow

A Fox once saw a Crow fly off with a piece of cheese in its beak and settle on a branch of a tree.

"That's for me, as I am a Fox," said Master Reynard, and he walked up to the foot of the tree.

"Good-day, Mistress Crow," he cried. "How well you are looking to-day; how glossy your feathers; how bright your eye. I feel sure your voice must surpass that of other birds, just as your figure does; let me hear you sing, that I may call you queen of birds."



"DO NOT TRUST FLATTERERS"

The Crow lifted up her head and began to caw her best, but the moment she opened her mouth the piece of cheese fell to the ground, only to be snapped up by Master Fox.

"That will do," said he. "That was all I wanted. For your cheese I will give you a piece of advice: Do not trust flatterers."

The Owl and the Pussy-Cat

The Owl and the Pussy-Cat went to sea
In a beautiful pea-green boat;
They took some honey, and plenty of money
Wrapped up in a five-pound note.
The Owl looked up to the stars above,
And sang to a small guitar,
"Oh, lovely Pussy! Oh, Pussy, my love!
What a beautiful Pussy you are!"

Pussy said to the Owl, "You elegant fowl!
How charmingly sweet you sing!
Oh, let us be married—too long we have tarried—
But what shall we do for a ring?"
They sailed away for a year and a day
To the land where the Bong-tree grows,
And there in a wood a piggy-wig stood
With a ring in the end of his nose.

"Dear Pig, are you willing to sell for one shilling
Your ring?" Said the piggy, "I will."
So they took it away, and were married next day
By the turkey who lives on the hill.



They dined upon mince and slices of quince,
Which they ate with a runcible spoon,
And hand in hand on the edge of the sand
They danced by the light of the moon.

Second Year. The work of the second year is a continuation of that of the first year. The amount of written work should be increased; the child's ability to describe what he sees and hears should be doubled, and the selections learned should be longer and more directly connected with character-building. The lines of work suggested for the previous grade should be continued. More attention should be given to details such as capitals and periods in writing, and the use of correct forms of pronouns and verbs.

1. *Oral Composition.* This is the most important line of work for the second and third years. If children speak correctly, they will write correctly, unless they become confused by the mechanics of writing. But, on the other hand, because children (or adults, for that matter) may write correct English, it does not follow that they will speak correctly. We should therefore place all possible emphasis on securing fluency and accuracy of speech.

The two chief essentials to good oral composition are that the child has something to tell and someone to whom he wants to tell it.

Subjects in which the pupils were interested the first year should be taken up again this year and enlarged upon, but the teacher must keep the lessons within the capacity of the pupils, or they will soon lose interest and enthusiasm. The teacher will find a wealth of material for language lessons in these volumes. The article *BIRD*, for example, and its related topics give an idea of the abundance of material which the work contains. Look up in a similar manner *ANT*; *BEE*; *DICKENS, CHARLES*; *LONGFELLOW, HENRY W.*; and the programs for special days.

2. *Picture Study.* Excellent lessons can be based on the study of pictures. The pictures should be such as will interest the children. Pictures of children and of animals and birds, provided they show action, can be used most successfully. The picture shown here is one of that sort. The little foreign children and the geese are all in motion, and all seem to be happy. Study the expression on the children's faces. Notice the natural poise of each figure, and the man on the curb holding the baby. The background suggests a village street as the scene of the play. Ask the pupils to give each child in the picture a name. Learn what the children know about geese, and if they do not know about them, give them the desired information (see *GOOSE*). These are Dutch children, and the teacher should tell the pupils how children take care of geese in Holland.





A HOLLAND SCENE, FOR PICTURE STUDY

Each child may be allowed to make up his own story about the picture, and finally, one story may be agreed upon by the class as the story that shall be told. The study should occupy several recitation periods.

3. *Written Work.* Progress from oral to written work should be natural; the necessity for programs, the visit of the class to some interesting place, or some interest suggested by another study might be the point of departure. The best results in written work are obtained in this year, if most of it is done by dictation. Let the pupils dictate for the teacher, who will write on the board what they say. She may also write questions, which the students may answer with complete sentences written on the blackboard. In this way they learn how their expressions appear in written form. Let the pupils do most of their writing on the board (see *PENMANSHIP*), with occasional exercises on paper. The main purposes of these exercises are (1) to secure expression of thought in correct written form, and (2) to gain facility in writing. Pupils should never be asked to write anything until they have recited it over and over, when they are perfectly familiar with it. All written work during the second year should consist of statements in the form of simple sentences; as—

The apple is red.
The ball is round.
The flower is pretty.

4. *Selections for Memorizing.* The following selections are types of the material suitable for second-year language work. While children

memorize readily at this time, systematic training in memorizing is necessary. They should memorize accurately, and the teacher should see that they know the meaning of the selection before they memorize it. The most successful methods of memorizing are those which employ the "whole" method, because it depends upon the *logical* memory as well as *verbal* or *mechanical* memory (see *MEMORY*). This method depends upon learning either the whole selection or large units of it, employing full understanding of its meaning, as opposed to learning a selection line by line in mechanical fashion. Generally, the pupils should tell the fables and other short stories in their own words, but poems should not be so treated.

Where Go the Boats?

ROBERT LOUIS STEVENSON

Dark brown is the river.
Golden is the sand.
It flows along forever,
With trees on either hand.

Green leaves a-floating,
Castles of the foam,
Boats of mine a-boating—
Where will all come home?

On goes the river
And out past the mill,
Away down the valley,
Away down the hill.

Away down the river,
A hundred miles or more,
Other little children
Shall bring my boats ashore

Autumn Fires

ROBERT LOUIS STEVENSON

In the other gardens
And all up the vale,
From the autumn bonfires
See the smoke trail!

Pleasant summer over
And all the summer flowers,
The red fire blazes,
And the grey smoke towers.

Sing a song of seasons!
Something bright in all!
Flowers in the summer,
Fires in the fall!

The Brown Thrush

LUCY LARCOM

There's a merry brown thrush sitting up in a tree;
"He's singing to me! He's singing to me!"
And what does he say, little girl, little boy?
"Oh, the world's running over with joy!
Don't you hear? Don't you see?
Hush! look! In my tree
I'm as happy as happy can be!"

And the brown thrush keeps singing, "A nest do
you see,
And five eggs hid by me in the juniper tree?
Don't meddle! don't touch! little girl, little boy,
Or the world will lose some of its joy!
Now I'm glad! now I'm free!
And I always shall be,
If you never bring sorrow to me."

So the merry brown thrush sings away in the tree,
To you and to me, to you and to me;
And he sings all the day, little girl, little boy,
"Oh, the world's running over with joy!
But long it won't be,
Don't you know? Don't you see?
Unless we're as good as can be."

The Goose That Laid the Golden Eggs

Once upon a time there lived a man who had a handsome Goose that every day laid a large golden egg. The man thought the Goose must have much gold inside of her, and so one day he wrung her neck, and found that she was just like any other Goose. Thinking to find wealth, he lost the little he had.

Third Year. 1. *The Textbook.* The third year is often a critical time in language work, for most courses of study call for the introduction of a textbook, either at the beginning or in the middle of the year. However meritorious the textbook may be, it is at first a stumblingblock to the pupil—a new tool which he has not learned how to use. It is the teacher's first duty to become thoroughly familiar with the book. She should know its plan and scope so well that she can readily adapt it to the class. Doubtless, several preliminary lessons will be necessary before the book is regularly taken up. Most language books now in use are well planned, and when the book is introduced, its plan should be followed; otherwise the pupils will become confused. This does not mean, however, that the

lines of work pursued in the previous years should be abandoned. The textbook should be a means of giving more definite plans for the continuance of this work.

2. *Oral Composition.* The work in oral composition should be greatly amplified during the third year. The pupils can now describe, quite fully and accurately, flowers, clouds, animals, and other natural objects. They will also be able to tell how a house is built, what is found in a grocery store, and to describe many of the occupations common to the locality. They can now reproduce such stories as *Golden Locks and the Three Bears*, *Cinderella*, and *Little Red Riding Hood*. A goodly number of myths and fairy tales should be given them, the longer ones being told or read by the teacher without any thought of their reproduction on the part of the pupils. Criticism can now become more pointed, and the pupil may be stopped in the midst of his recitation and asked to correct his language, without the danger that such interruptions will affect his fluency, provided it is done in a kindly spirit. At this age, pupils are likely to wander from the subject, and this tendency should be checked as soon as it appears. Encourage the children to be natural.

The teacher can find no better source of material for this work than in these volumes. History stories and stories of the boyhood of great men should be introduced this year.

3. *Written Work.* The pupils should now be able to give short, connected accounts, in writing, of what they learn, and the written exercises should be increased in frequency and in length. To the exercises in original composition should be added exercises in copying stanzas of poetry and short paragraphs from the reader or other books. These exercises should be brief, but the teacher should insist upon accuracy. The work here suggested is supposed to be supplementary to the exercises given in the language book. Many written exercises admit of illustration, and the pupils should be encouraged to draw them, since each mode of expression aids the other.

4. *Letter Writing.* All the writing that most of the pupils will do after they leave school will consist in writing letters, and exercises in letter writing can be given with profit in the third year. The letters should be brief, and should be written to some one whom the writer knows, and for a specific purpose. A boy, for instance, may write to his father or brother asking for something he needs. See **LETTER WRITING**.

Perhaps a word of caution will not be out of place at this point. While we have placed increased emphasis upon the written work for this year, we would not convey the idea that written exercises should constitute the greater part of the pupils' work in language. These exercises are a means to an end, and they

should not be made burdensome. The oral work should receive by far the greater amount of time all through this and the following year.

5. *Selections for Memorizing.* The poems and stories this year should be of such nature as to strengthen the character. Longfellow's *Children's Hour*, *The Day Is Done*, *The Builders*, many of the poems of Robert Louis Stevenson and Alice and Phoebe Cary, George MacDonald's *The Baby*, and Moore's *A Visit from Saint Nicholas* are good examples of suitable poems. In addition to the history stories and biographies already referred to, *Robinson Crusoe*, *Hans Brinker*, and *The Ugly Duckling* are good types of tales that may be read or told.

Fourth Year. The work of this year is practically an expansion of the work of the third year. The pupil is gaining more and more from his textbooks as he learns how to use them. The work in geography should now be used as a source of new material. Children are always interested in the children of other lands, and the study of child life in other countries at this time will prove interesting and profitable.

1. *Oral Composition.* The pupils should now begin to understand the difference between telling a story and describing an object. The importance of arranging what they tell in a natural order should also be constantly kept before them. They should be asked to tell in their own words stories that they have read, to describe places they have visited, and people whom they have seen. The clouds, the wind, rain, snow, and storms should be studied and described. Pupils will take great pleasure in describing such events as Wolfe's capture of Quebec, Braddock's expedition, with special emphasis on the part taken by Washington, the settlement of Jamestown, and that of Plymouth. The material for this work is so abundant that the problem for the teacher is merely one of selection.

2. *Use of the Dictionary.* The pupils should be provided with a small dictionary at the beginning of this year and should be taught how to use it. Of the many dictionaries on the market, two are worthy of special consideration—*Webster's International* and the *Standard*. Small dictionaries bearing the imprint of the publishers of either of these great works are standard, differing from the larger works chiefly in the amount of information they contain. The teacher should give frequent lessons upon its use until pupils have become familiar with the book.

3. *Study of Selections.* The school reader will furnish many valuable language lessons, since many of its selections are worthy of special study. Longfellow's *Paul Revere's Ride* is an example of such a selection. It is not enough merely to read the poem. The events

of which it treats should be studied, a map of the region over which Revere rode should be drawn, and the beautiful pictures in the poem should be described by the pupils in their own words. Finally, the poem should be memorized. The course of study will determine the amount of this sort of work that can be done.

4. *Written Work.* The amount of written work should be increased and special attention should be given to the use of correct forms of verbs and pronouns, and to the common errors of speech that are likely to creep into written work. The pupil is now old enough to begin to understand why he should use certain forms and why he should never use others. The exercise should be lengthened, and the pupils should be led to rely upon themselves, but still the oral work should receive the greater amount of attention. Letter writing should be emphasized, and the keeping of personal diaries sometimes proves interesting.

Fifth Year. The practical phase of the work should be emphasized throughout the year. That is, the business vocabulary of the pupils should be extended, and the correct use of common business terms, such as *merchandise*, *gain*, *loss*, *interest*, *commission*, and *percentage*, should be learned. Were it not for the fact that at the end of this year many of the pupils will leave school, these terms could be left until the next year. They should be so taught as to lead the pupils to realize the vital relation between language and arithmetic. It is unnecessary to repeat here what has been said about oral and written work in the previous years. Some new phases, however, should now be introduced.

1. *Study of the Sentence.* The pupils may have learned some of the parts of speech, as *noun*, *verb*, *pronoun*. They may also have learned the parts of a sentence. Be this as it may, they should now learn the importance of the sentence in both oral and written expression—that unless one expresses himself in sentences, he says nothing in speaking or in writing. Perhaps lack of sufficient drill upon the sentence is the greatest weakness in the language work of the public schools. Only the foundation facts, that the essential parts of a sentence are subject and predicate, that the subject and predicate must agree in person and number, and that in some sentences a third part, the object, must be added to complete the meaning, should be taught in this year; but these great sentence facts should be dwelt upon until the pupils thoroughly understand them. Some special drill exercises will be necessary to secure the desired results, but most of this study should be in connection with the lines of work already explained.

2. *Explanations.* Some teachers carry explanations in arithmetic to the extreme, and when explanations are mentioned, they imme-

diately think of those associated with that study. An entirely different sort of an explanation is meant here. Some boy knows how to make a kite or a radio; let him explain to the class how it is done. Assign the exercise two or three days in advance, so that he may have time to prepare for it; then expect a complete explanation, and allow the members of the class to ask such questions as may be necessary to give them a clear understanding of the subject. Ask a girl to explain how to cover a book, or to make bread; use many common occupations for material. The value of these exercises consists in the training they give in orderly arrangement of the subject on the part of the pupil, in leading to conciseness and definiteness of statement, and in thorough preparation on the subject. They lead the pupil to talk before the class without suffering from a self-consciousness that will deprive him of all fluency in his recitation. The explanation is the first step in a series of exercises which should lead the pupils to become so proficient in oral composition that they can discuss in public any question that they understand.

3. *Correspondence.* Letter writing should develop into correspondence this year. The lessons in geography and history may be used as the basis for this work. Pupils may write letters describing some foreign country or a distant city. History pupils may assume that they are living in the time studied, as, for instance, the time of the Revolutionary War; now and then some pupil may impersonate one of the characters of history, and write the class a letter expressing his views on some topic that was a live question of that day. Letters which may be written to actual persons or companies, and sent with the expectation of an answer, are of more value than those which the pupil knows will never leave the classroom. Correspondence with other pupils of the same age, and simple business letters asking for information, catalogs, etc., are examples of actual projects. Some such plan as this gives definiteness to the correspondence and affords excellent training in the use of the imagination.

Sixth Year. If pupils have been properly trained in English, they should be able to speak and write with only occasional errors when they enter upon their sixth year's work. The errors will, in the main, be peculiar to certain pupils, and the teacher can help herself in securing their correction by keeping a sort of card index of these errors. To illustrate:

Andrew Johnson: Omits *g* from such words as *morning*. Uses *seen* for *saw* and *them* for *they*.

Tom Brown: Uses *done* for *did*. Subjects and predicates do not agree in person and number.

These cards enable the teacher to recall at a glance just what faults should receive attention in the work of each pupil, and by persistent

effort, she will be able to correct most of such errors during the year. The work of the fifth year should be expanded. More extended study should be given the sentence. All the parts of speech should be learned, the parts of a complex sentence studied, and the difference between complex and compound sentences should be taught.

1. *Business Letters and Forms.* The pupils should write letters applying for positions, ordering goods, asking payment for debts past due, and letters to accompany remittances in payment of bills [see LETTER WRITING (Business Letters)]. Special attention should be given to form, punctuation, and language. Impress upon the pupils the prestige that ability to write a good business letter gives a person. Pupils should receive such training in writing promissory notes and receipts as will enable them to write them correctly (see NOTE; RECEIPT).

2. *Talks before the School.* Great interest can be added to the morning exercises by having different pupils give talks of two or three minutes on subjects in which pupils of this grade are interested. One boy may tell how shoes are made; a girl may tell about the home of Louisa M. Alcott, and possibly describe one of her books; another may tell about the robin or some other bird common to the locality. An abundance of material for these talks may be found in these volumes. Two or three talks a week can easily be arranged. In giving them, the pupil has only taken a step in advance of explaining a subject to the class, and the benefit derived from the exercise is well worth the time and effort required.

3. *The Study of Literature.* Pupils now have enough power of discrimination to study with profit some of the best literature. This will enable them to enrich their vocabularies and to become so familiar with the figures of speech that they will use them in their conversation and oral composition. Teachers sometimes fail to secure the results expected because they choose too difficult selections. A selection for critical study should be easily understood by the pupils; otherwise so much thought must be given to the interpretation that there is little left for analysis. Moreover, a thorough study of a selection which the pupil thinks he knows perfectly will usually bring out meanings that he never thought of. Bryant's *Gladness of Nature*, Lowell's *The First Snowfall*, and Longfellow's *A Psalm of Life* are good examples of poems suitable for study during this year, and Hawthorne's *Tales of the White Hills*, Dickens' *Christmas Carol*, and Irving's *Rip Van Winkle* and *Legend of Sleepy Hollow* serve as good examples of what may be used. Care should be taken not to make the study cover so many details that the pupils will tire of the selection before it is completed.

Seventh and Eighth Years. The additional work of these years should consist in the study of formal grammar (see GRAMMAR). Additional facilities for written and oral expression should be given. Special projects which may occupy the class time for a week or more, giving training in both oral and written composition, are helpful and interesting. The subject of local pioneer history is one which affords material for project work in almost every school community. It may be divided into topics for each pupil's special attention, with programs, exhibits of pioneer relics, short plays, or written booklets. See PROJECT METHOD IN TEACHING.

The word *composition* should be avoided in any formal sense, for it adds self-consciousness and formality to work which depends for part of its value upon its naturalness.

1. *Debates.* Every boy, by the time he has reached the age of twelve, likes to engage in argument, so an occasional debate should constitute a feature of the seventh year's work. The argument, like the explanation, leads to logical arrangement of his discourse on part of the pupil, and also to thorough preparation. Subjects chosen should always be within the grasp of the pupils, and within the range of their interests. Such questions as why the new schoolhouse should have an assembly hall, or why the school grounds should be enlarged, will secure a lively debate in which the pupils will freely express their opinions.

2. *The Literary Society.* Much interest can be added to the work in language during the eighth year by the organization of a literary society or club, to be managed by the pupils under supervision of the teacher. For plan for organizing and conducting such a society, see PARLIAMENTARY LAW.

Related Subjects. The following articles in these volumes have to do with the general subject of language study. Some of them are more closely related to the more formal topic of grammar, but the line of division is not sharply drawn:

Adjective	Literature
Adverb	Mode
Article	Noun
Case	Parsing
Comparison	Participle
Conjugation	Parts of Speech
Conjunction	Penmanship
Debate	Person
Declension	Preposition
Dictionary	Pronoun
Etymology	Punctuation
Gender	Quotation Marks
Grammar	Sentence
Infinitive	Story-Telling
Inflection	Syntax
Interjection	Tense
Letter Writing	Verb

LANGUAGE OF FLOWERS. See FLOWERS, subtitle.

LANGUAGES OF THE WORLD. Occasionally, some man appears who makes it his life work to set forth the advantages that

would follow if all the world spoke one tongue; consequently, several "universal languages" have been evolved. There is Volapük, or "world speech," which dates from 1879; it was the inspiration for international congresses and found supporters in every civilized country; there is also Esperanto, which still thrives and has grammars and periodicals devoted to it; there is "Idiom Neutral," an outgrowth of Volapük, which is considered to be so simple that an educated reader can master it well enough to read it within a few hours.

Some of the advocates of these universal tongues are so enthusiastic and so hopeful that they believe it would actually be possible, though a slow process, to supplant other languages and in time have a real "world speech," at least for Europe and America; but the more conservative persons merely aim to produce a speech which shall be used only for international purposes, and exist side by side with the languages of the various countries. So far, this object has persistently failed of success. The new, invented language may be more reasonable, more logical than those already in existence, but it is not and cannot be vital. No people's life is woven into it; no contacts and withdrawals are shown in it, and there remain, instead of the *language* of the world, the *languages* of the world, as sharply differentiated as at any time in their history. Each one expresses in a large degree the genius and spirit of the people who developed it.

Kinds of Languages. The fact stated above will bear emphasis—that the history of a people is legible in its language; and the greatest nations, those which have swayed the destinies of the world, have fashioned the greatest languages. The language of Greece was exquisite, musical, as truly a work of art as any statue ever hewn from marble; the Roman language was strong, compact, as capable of accomplishing its purpose as was the Roman legion. In the articles in these volumes on the various languages, the chief characteristics of each are pointed out—the musical quality of Italian, the delicacy and precision of French, and so on.

Many men have given their lives to the study of languages, and to classifying them. There are languages in which no word has more than one syllable, like the Chinese; and on the other hand, there are those, like the German, which contain ponderous words of seven or eight syllables. There are tongues, belonging almost entirely to comparatively undeveloped peoples, which make use of but a few sounds, and there are others, as English, which have more than twoscore. Then there are divisions according to grammatical structure, as languages which inflect their words to show varying relations, and languages which have slight inflection or none at all. However, all of these technical distinctions are the province of the

scholar; the ordinary reader, even the ordinary student, has little interest in them. On the other hand, he is interested in such questions as, How many languages and dialects are there in the world? How many sounds or articulations are there in all of them? Which

unless it was the ancient Sanskrit, has ever made use of more.

The Chief Languages. As to the number of people speaking the various important tongues, and the countries in which they are spoken, the accompanying table gives such information

LANGUAGE	WHERE SPOKEN	BY HOW MANY PEOPLE
Basque.....	Southern France and Northern Spain	440,000
Bohemian, or Czech..	The official language of Czechoslovakia, spoken by 9,000,000 of its 14,500,000 people. The United States has the second largest number of Czechs—500,000	10,000,000
Bulgarian.....	Bulgaria and Eastern Rumelia.....	5,650,000
Chinese.....	China. Of course there are in this vast country many dialects.	400,000,000 (estimated)
Danish.....	Denmark and Northern Schleswig.....	about 3,500,000
Dutch.....	Netherlands, and by the Boers of South Africa. The language of these latter is, however, a strongly marked dialect.	8,000,000
Egyptian.....	Egypt. Almost one-tenth of the population, Arabs, Turks, Greeks, British, speak other languages.	about 10,500,000
English.....	The British Empire and British Commonwealth of Nations, and the United States.....	190,000,000 (at least)
Flemish.....	Northern provinces of Belgium.....	about 3,500,000
French.....	France and its colonies. There are also about 3,000,000 French-speaking people in Belgium, about 750,000 in Switzerland and about 2,125,000 in Canada.	52,000,000 (at least)
German.....	German Republic, Luxemburg, Switzerland, and parts of Austria. There are also many German-speaking people in other countries, as Russia and the United States, so that the total is about	80,000,000
Greek.....	Greece, large parts of Asia Minor, Cyprus, Crete.....	about 9,000,000
Hindustani.....	Northern India.....	100,000,000
Italian.....	Italy, with its islands, and some parts of Austria, Switzerland, and France.....	42,000,000
Japanese.....	Japan.....	53,000,000
Norwegian.....	Norway.....	3,000,000
Persian.....	Persia.....	12,000,000
Polish.....	The regions comprising the republic of Poland, formerly included among Russia, Germany, and Austria-Hungary. There are also about 1,000,000 Polish-speaking people in America.....	16,000,000
Portuguese.....	Portugal, Brazil, and various Portuguese colonies.....	26,200,000
Russian.....	Throughout Russia and parts of former Galicia and Hungary	147,000,000
Serbo-Croatian.....	Serbia, Montenegro, Croatia, Slavonia, Bosnia and Herzegovina, and Southern Hungary (now comprised in Yugoslavia).....	12,000,000
Spanish.....	Spain, Mexico, Central America, much of South America, the Philippines and the Antilles.....	50,000,000
Swedish.....	Sweden.....	6,000,000

language is spoken by the most people? Which is spoken in the most countries? Which is spreading most rapidly?

First of all, it is estimated that there are in the world over 2,500 languages and dialects. Certain of the dialects, to be sure, differ from each other very slightly, but some of the languages are as far apart as is civilization from savagery. And in all these tongues there are no fewer than 300 different articulations—300 ways in which the vocal organs must be used to produce sounds. Some of the more primitive tongues make use of but a very few, sounding to the unaccustomed ear almost like a series of grunts; while English, on the other hand, uses almost fifty. Probably no language,

in compact form. No account is taken of the languages of savage tribes, which have received comparatively little study, and concerning which no estimates can be given.

From this table it may be seen that Chinese is spoken by more people than any other language in the world. English ranks next, and is thus first among the European languages. Of these, Russian is second and German third; Hindustani occupies the fourth place among the languages of the world.

It is an interesting fact that the languages of all the most important peoples of the world, except the Chinese and Japanese, belong to one great family, the Aryan, or Indo-European, group of languages. Tongues as different as

Hindustani, Russian, and English are all members of this group, which includes every tongue of Europe except the Basque, which is unrelated, so far as anyone knows, to any other language; and the Finnish and Hungarian, which belong to the Ural-Altaic family. *Ex oriente lux*, a popular saying meaning *light out of the East*, may thus apply not only to religion but to language as well, for just as every great religion of the world originated in Asia, so, it is believed, did the one parent tongue from which all the Aryan languages are sprung have its first home in Asia, the continent of beginnings.

Related Subjects. The important languages of the world are treated in separate articles in these volumes:

Bengali	Italian Language
English Language	and Literature
Esperanto	Latin Language
Flemish Language	Plattdeutsch
and Literature	Provençal Language
French Language	and Literature
German Language	Romance Languages
Greek Language	Sanskrit Language
Hebrew Language	and Literature
and Literature	Sign Language
Hieroglyphics	Syriac

Volapük

LANGUE D'OIL, *doh eel'*, AND LANGUE D'OC. See FRENCH LANGUAGE (History).

LANIER, *la neer'*, SIDNEY (1842-1881), an American poet who stands in the front rank of artistic writers of the latter part of the nineteenth century. He has been compared to Poe in his ability to impart a musical quality to his verse, and he added a moral element which evinces his high and noble character. He has been called the "sunrise poet" because of his appreciation of the beauty of nature in the early morning hours, and his truthful portrayal of it in his melodious verses.

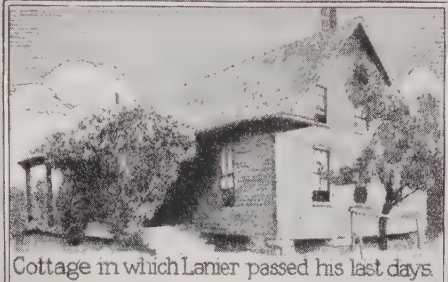
Lanier was born at Macon, Ga., and obtained his education in the schools of his native state. In 1860 he was graduated from Oglethorpe College, and served one year there as an instructor. From his early youth he had been devoted to the study of music, and this continued to be one of his major pursuits. His favorite instrument was the flute, and he became so proficient that in later years he was employed by the Peabody Symphony Orchestra of Baltimore. See BALTIMORE, MD.

On the outbreak of the War of Secession, Lanier joined the Confederate forces, serving in the signal corps and in connection with blockade-running. His vessel was captured,



Photo: Brown Bros.

SIDNEY LANIER



Cottage in which Lanier passed his last days.

LANIER'S BIRTHDAY

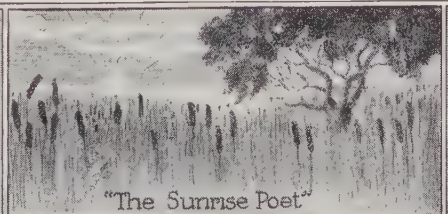
SUGGESTED PROGRAM

The program as here given is of course too long. It will be necessary to make selection.

Song, *Ballad of Trees and the Master* Lanier
 Roll Call, Quotations from Lanier
 Owl against Robin Lanier
 Essay, *Sketch of Lanier's Life*
 The Tournament Lanier

By two pupils

Reading, *The Story of a Proverb*
 Lanier
Barnacles Lanier
 Essay, *Comparison of Lanier with Other Southern Poets*
 Essay, *Lanier the Musician*
Song of the Chattahoochee Lanier
The Better Way Susan Coolidge
 Reading, *Bob: The Story of Our Mocking Bird* Lanier
The Hard Times in Elfland ... Lanier
 Essay, *The Founding of the Round Table*
 Character Sketch of King Arthur
Life and Song Lanier
The First Steamboat Up the Alabama Lanier
 Essay, *Description of the Marshes of Glynn*
Tampa Robins Lanier
Dying Words of Stonewall Jackson
 Lanier
 Essay, *What Lanier Stands for in the Life of the South*



and he served five months as a prisoner of war. The exposures and hardships to which he was subjected undermined his health, and he developed symptoms of tuberculosis which became more pronounced in succeeding years.

After being discharged from the service, he returned home and for several months was severely ill. He sought to regain his health by various changes of climate and location, but his malady grew steadily worse, and he died in a camp at Lynn, N. C.

His Place in Literature. Lanier's literary career began in 1867, with the publishing of an unsuccessful novel, *Tiger Lilies*, founded on his war experiences. One of his first poems, *Corn*, was printed in *Lippincott's Magazine* in 1875, and attracted so much attention that he was asked to write the words to a cantata composed by Dudley Buck and sung at the Centennial Exposition. The first complete edition of his poems appeared in 1876. In 1879 he was appointed lecturer on English literature at Johns Hopkins University.

While teaching, he wrote two critical volumes of considerable importance: *Science of English Verse* (1880) and *The English Novel and the Principles of its Development* (1883). He is known to young people for his adaptation of the *Mabinogion*, the chronicles of Froissart, and the story of King Arthur, and for such delightful sketches as *Bob: The Story of Our Mocking Bird*; and *The Story of a Proverb*.

Lanier's finest and most spiritual work is seen in the *Hymns of the Marshes*, two of which, *Sunrise* and *The Marshes of Glynn*, are the wonderful imaginative songs of a dying man. These *Hymns* rank among the best productions of American poetry [see AMERICAN LITERATURE (Poets)]. His *Song of the Chattahoochee*, *A Song of the Future*, *A Song of Love*, *An Evening Song*, and others are songs in the true, literal sense.

The following lines from his *Marshes of Glynn* are representative of the quality of his verse:

And what if behind me to westward the wall of the
wood stands high?
The world lies east: how ample, the marsh and the
sea and the sky!
A league and a league of marsh-grass, waist-high,
broad in the blade,
Green, and all of a height, and unflecked with a light
or a shade,
Stretch leisurely off, in a pleasant plain, to the ter-
minal blue of the main.

LANKA. See RAMAYANA.

LANSDOWNE, *lanz' down*, HENRY CHARLES KEITH PETTY-FITZMAURICE, Fifth Marquis of (1845-1927), one of that small group of men in Great Britain who are taught from boyhood to take leading parts in public life. He was educated at Eton and at Balliol College, Oxford, and succeeded to the family estates and titles in 1866. Thus elevated to the House of Lords at an age when most young men are finishing their schooling, he lost no time in making his influence felt. In various Liberal Ministries, he was in turn a Lord of the Treasury (1869-1872), Undersecretary of State for War (1872-1874), and Undersecretary of State for India (1880). His resignation from the last office was a sharp protest against Gladstone's

policy toward Ireland, and when Gladstone, in 1886, finally espoused Home Rule, Lansdowne was one of those who joined the Liberal Unionist party.

In the meantime, Lansdowne had been appointed Governor-General of Canada to succeed the Duke of Argyll (Marquis of Lorne). His tenure of this office, from 1883 to 1888, was marked by considerable internal progress, notably the completion of the Canadian Pacific Railway. The Saskatchewan, or Riel, Rebellion and the arbitration of the fisheries dispute with

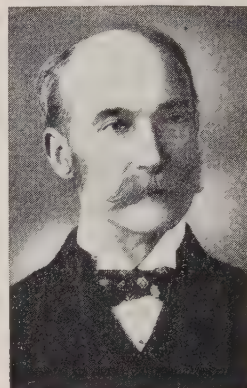


Photo: Brown Bros.

LORD LANSDOWNE

the United States were other noteworthy features. After five years in Canada, Lansdowne spent five years in India as Viceroy.

After 1905 Lansdowne became leader of the Unionist opposition in the House of Lords. Although nominally a Liberal in early life, he was temperamentally conservative, a fact which was strongly revealed in 1909, when he bitterly opposed the Lloyd George budget, and in 1916, when his opposition defeated Lloyd George's compromise of the Home Rule question. In May, 1915, Lord Lansdowne entered the coalition Ministry, formed by Premier Asquith, as Minister without portfolio. With the fall of the coalition Cabinet and the ascendancy of Lloyd George, Lord Lansdowne retired to private life.

LANSDOWNE, ZACHARY. See AIRCRAFT (Loss of the *Shenandoah*).

LANSFORD, PA. See PENNSYLVANIA (back of map).

LANSING, MICH., the capital of the state and one of Michigan's automobile cities, is south of the geographical center of the state, at the point where the waters of the Grand and Cedar rivers meet. Detroit is eighty-five miles southeast, and Grand Rapids is sixty-four miles northwest. In a park of ten acres, in the heart of the city, stands the imposing state capitol, which was completed in 1879. The first settlement on the site was made in 1837; it was chosen to succeed Detroit as the state capital in 1847, chartered as a city in 1859, and rechartered in 1897. Population, 1928, 79,600 (Federal estimate).

Transportation. The city is served by the Grand Trunk, the Michigan Central, the New York Central, and the Pere Marquette railroads, and by electric and motorbus lines.

Industries. Lansing is notable as the location of great automobile plants. There are approximately

180 other diversified manufacturing concerns, making auto bodies, gas engines, screws, and other steel products.

Institutions. Lansing has the state school for the blind, state industrial school for boys, a Carnegie Library, and a state library. At East Lansing is located the Michigan State College, which is the oldest agricultural college in the United States; connected with it is an agricultural experimental farm of 675 acres. A United States Weather Bureau station is also located here. Lansing also maintains a summer camp for tubercular children.

LANSING, ROBERT (1864-1928), Secretary of State in the government of the United States during one of the most trying periods of the country's history. He was born in Watertown, N. Y., was graduated from Amherst College in 1886, and was later the recipient of honorary degrees from Amherst, Princeton, Colgate, and Columbia universities, Union and Kenyon colleges, and the University of the State of New York. Lansing's public service began in 1892, when he was associate counsel in the Bering Sea controversy; later he was counsel in the Alaskan Boundary tribunal, counsel in the North Atlantic fisheries arbitration at The Hague, and agent in the American and British Claims Commission.

In 1915, when he held the post of counselor for the Department of State, Lansing was advanced by President Wilson to the office of Secretary of State, to succeed William J. Bryan. In this exacting position he served from June, 1915, to February, 1920. His term included the period of America's participation in the World War, and his grasp of international affairs was of great service to his country. While at the head of the Cabinet, he was one of the five members in attendance at the Peace Conference in Paris (see VERSAILLES, TREATY OF).

Lansing resigned in 1920 at President Wilson's request, because the latter felt that the Secretary of State had overstepped his authority during the illness of the Chief Executive. Lansing then engaged in the practice of law, and was counsel for Chile in the Tacna-Arica Arbitration (1923-1925). Among his writings are two volumes on the Peace Conference—*The Peace Negotiations* and *The Big Four and Others of the Peace Conference*.

LANTERN, MAGIC, an old name for the stereopticon (which see).

LANTERN FISH, any of a large group of deep-sea fish whose distinguishing characteristic is the presence of luminous organs along the sides of the body, which may be either in the head or near the tail. Living as they do in the depths of the ocean, it appears that they have been provided by nature with the light necessary for them. Many lantern fish are extraordinarily grotesque in appearance, with enormous heads and huge mouths armed with large teeth. A lantern fish about a foot long,

which dwells along the Grand Banks of Newfoundland, is commonly known as the *viper fish*, because of its long, slender, snakelike body. One of the most curious of these oddly formed



fish is to be found only at great depths; it resembles a whale in shape and color, but is less than six inches in length.

L.H.

[These fish belong to several different families and genera. Scientists disagree as to their classification.]

LANTHANUM, *lan' tha num*. See CHEMISTRY (The Elements).

LAOCOÖN, *la ok' o on*, in ancient classic legend, a priest of Neptune or Apollo, who warned



THE LAOCOÖN GROUP
In the Vatican, Rome.

his Trojan countrymen against bringing into the city the wooden horse by which the capture of Troy was made possible (see TROY; WOODEN HORSE). The goddess Minerva, to whom the Greeks had consecrated the wooden monster

in revenge for his warning caused two snakes to come out of the sea. They first twined themselves around the two sons of Laocoön, who rushed to their rescue, and when he vainly endeavored to save them, the serpents attacked him and crushed all three of their victims to death. Vergil's description of the death of Laocoön, given in the second book of the *Aeneid*, was probably inspired by the marble group of the Trojan priest and his two sons, which was found in Rome in 1506. This is one of the most remarkable sculptured groups which time has spared to us. It is now in the Vatican gallery of sculpture.

LAOMEDON, *la om' e don*, the father of Priam (which see).

LAOS, *lah' oze*. See FRENCH INDO-CHINA.

LAO-TSE, *lah' o tsuh'*, founder of Taoism (which see); see, also, CONFUCIUS.

LA PAZ, *lah pahz'*. See BOLIVIA (The Cities).

LAPIDARY, the name applied to one who cuts, polishes, and engraves gems. Over sixty centuries ago, lapidaries flourished in Assyria, Babylonia, and Egypt, the earliest work in stonecutting being done with the sapphire point. About 3000 B.C. the bow drill was introduced, a device employed also by the American Indians. Previous to the fourteenth century, gems were for the most part cut *en cabochon*; that is, polished smooth, with the original size and color of the stone retained as far as possible. The practice of cutting on the surface of the gem flat facets having a geometrical arrangement, or faceting, is of modern origin. Transparent gems, such as diamonds, are usually faceted because the reflection and refraction of light on their surfaces give them additional brilliancy. Opals, moonstones, turquoises, and other opaque and translucent stones are cut *en cabochon*. Modern gemcutters use a lathe carrying a point or disk of soft iron, coated with diamond dust and oil. See GEMS.

Derivation. The word *lapidary* is from the Latin *lapis*, which means stone.

LAPIS LAZULI, *la' pis laz' yu li*, OR **LAZURITE**, *laz' u rite*, a mineral whose beautiful azure-blue color makes it of value for ornamental purposes. It is composed chiefly of aluminum, sodium, silica, and sulphur, and is found both in massive form and in crystals, in granite, and in limestone. Some varieties show green, violet, or red tints; occasionally, lapis lazuli is found which is flecked with brilliant spots suggesting the stars shining in the blue firmament. The Egyptians made use of this mineral in their jewelry, and the Romans called it *sapphire*. Modern nations have employed it in ornamental and mosaic work, and in the construction of altars and shrines. Formerly, it was the only source of the paint

ultramarine, but it has been replaced for that purpose by an artificial product. The ancients, who believed that the mineral possessed medicinal value, ground it to powder and then mixed it with milk, forming a dressing for boils and ulcerations. The best specimens come from Mexico, China, Siberia, Persia, India, and Chile. See GEMS; ULTRAMARINE. T.B.J.

LAPLACE, *lah plahs'*, PIERRE SIMON, Marquis de (1749-1827), the most famous of French astronomers, called "the Newton of France" and "the greatest mathematician of his age." To him the world is indebted for a series of brilliant discoveries in regard to the theory of planets, the question of tides, and the problem of the stability of the solar system. Especially is his name connected with the world-famous theory of the origin of the solar system, the nebular hypothesis, now largely discredited. See NEBULAR HYPOTHESIS (Planetsimal Hypothesis).

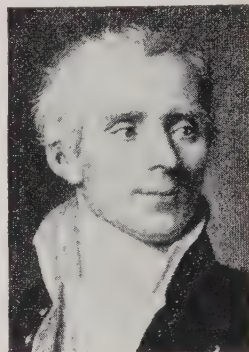


Photo: Brown Bros.

LAPLACE

Laplace was the son of a poor farmer of Beaumont-en-Auge, and it was through generous friends that he was able to attend the College of Caen and the Military School at Beaumont. When only twenty years old, he became professor of mathematics in the Military School of Paris, and from that time on, he advanced steadily in fame and in position. Elected one of the "forty immortals" of the French Academy in 1816, Laplace before his death became a member of nearly every learned society in the world.

Writings. His most celebrated work, *Celestial Mechanics*, is a masterpiece of scientific writing. Of almost equal merit is his *Exposition of the System of the Worlds*, in which he set forth the nebular hypothesis.

LAPLAND. In a land where there are nine months of extreme cold every year, where vegetation consists of little but mosses, lichens, and sparse growths of birch, pine, and fir, life must of necessity be difficult to maintain. Lapland is in Arctic Northwestern Europe, and is so called because it is the home of the people known as Lapps. It is a bleak land, where the struggle for a livelihood is difficult; but the Lapps, though the smallest people of Europe, have great endurance and usually live in happiness and contentment.

Lapland is not a political unit; it really belongs to three countries—Norway, Sweden, and Finland. On the north is the Arctic Ocean, on the east the White Sea, and on the west the



Photos: Wide World; U & U

Everyday Life in Lapland. Father and son attending a herd of reindeer. Women weaving cloth by hand, utilizing the most primitive implements. All Lapps live in a crude manner, although they are acquiring some of the advantages of more favored countries.



TYPICAL LAPLAND FAMILY AND HOME

Norwegian Sea. The southern boundary is indefinite, but the area of about 150,000 square miles consists of the Norwegian provinces of Nordland, Tromsø, and Finnmarken; part of Sweden's province of Norrland and all of Norrbotten; Northern Finland and the Kola Peninsula, which belongs to Finland.

The People and Their Mode of Living. In this land where, in the extreme north, there are

need new ones, seldom washing even their faces. They are dirty, yet healthy; uneducated,



LOCATION MAP

two months of continuous daylight and two months of unbroken darkness, live a strange people numbering about 25,000. They are small, averaging not more than five feet in height, muscular, large-headed, with low foreheads, high cheek bones, flat features, and lips straight and thin. Their hair is black and straight, their faces yellowish. Year in and year out, they wear their garments of wool and reindeer skins, never removing them until they



INTERIOR OF A LAPP HUT

©
Cooking is done at a fire in the center of the hut, the smoke filling the room and finding its way out at the top.

but, perhaps because of their ignorance, fairly contented. They can, however, be cruel and

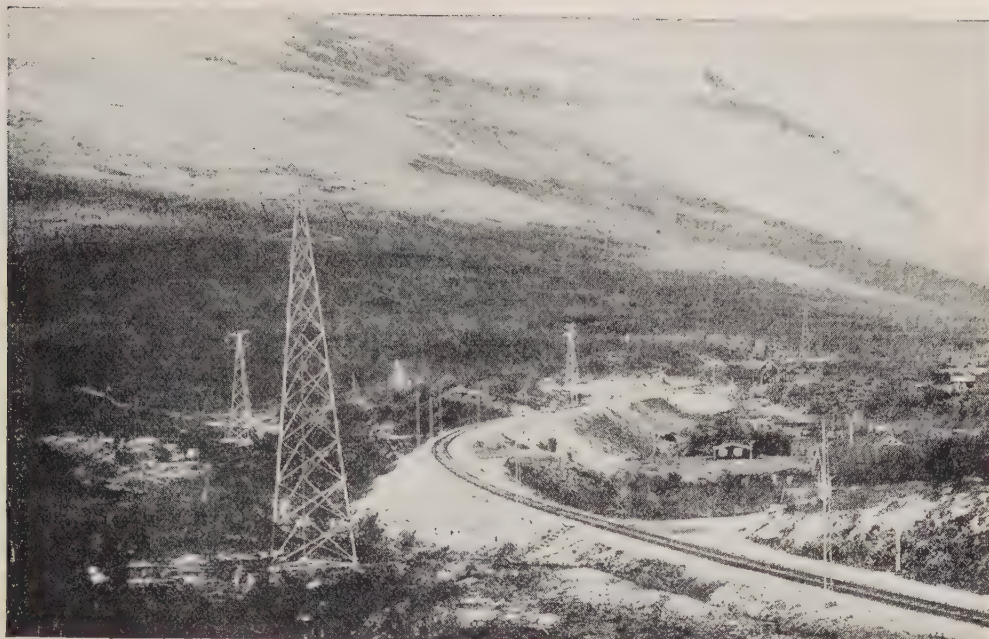


Photo: O R O C

ELECTRICITY HAS REACHED LAPLAND

The most northerly electric-railroad station in the world. The photograph was taken at Abisko, north of the Arctic Circle. The railroad is electrified for 265 miles; only a few miles are in Lapland.

selfish, for many of them have a great love of money and drink.

There are three groups of Lapps. The *Mountain Lapps* live a wandering life, moving from place to place with their herds of reindeer, and pitching their tents wherever herbage is plentiful; as described in the lines by James Thomson—

The reindeer form their riches; these their tents,
Their robes, their beds, and all their homely wealth
supply.

The children of the Mountain Lapps, who know nothing of the happy, care-free life of boys and girls in lands to the south of them, seem like little old men and women, for they must early do their share of the work of the household. In one cone-shaped tent, the entire family, including dogs, live, eat, and sleep. These simple people pass an uneventful existence, content to rove from place to place, living chiefly on reindeer meat, cheese, and reindeer milk, drinking melted snow, and cheerfully fighting the elements of snow, rain, and winds.

The *Sea Lapps* are more numerous than the Mountain Lapps. They live along the coast in rude huts of wood and sods, and their principal occupation is fishing. Their life is more civilized, and a number of families build their homes close together to form little settlements. The *River Lapps* are perhaps the most progressive. They live in settlements on river

banks, and fish, hunt, keep reindeer, cows, and sheep, and do a little farming.

The language of the Lapps is similar to Finnish. Most of the people profess Christianity, and they travel many miles in their reindeer sledges to attend the churches.

Economic Resources. The most valuable resource of the entire Lapland region consists of the beds of iron ore in Southern Swedish Lapland, which are among the best and most extensive in the world. Mines are being worked at Gellivare and Kirunavaara. A 280-mile railroad has been built from Lulea, a port on the Gulf of Bothnia, to the fiord district of Norway, forty-four miles north of the Arctic Circle, and another around the north of Bothnia, to reach an ice-free port for the export of ore to England and Germany.

LA PLATA, *lah plah' tah*. See ARGENTINA (The Cities).

LA PLATA, RIO DE. See RIO DE LA PLATA.

LAPORTE, IND. See INDIANA (back of map).

LAPPS, the people of Lapland (which see).

LAPWING, a crested plover, one of the commonest and best-known birds of Western Europe, especially in the British Isles, where it is resident the entire year. It is partly bronze-green in color, with the throat and breast blue-black, and the sides of the head and neck and the under parts white. It has a handsome and graceful appearance while on the ground, but in flight it has an awkward,

flapping movement, which gives it its name. It is also called the *peewit*, from its shrill, wailing cry. The lapwing has the habit of pretending to be lame or hurt when its nest or young are approached, by this ruse luring the intruder off to a safe distance. Its nest, which is a depression in the soil, contains four olive-green eggs, thickly spotted with black and brown. The eggs are considered a great delicacy, and are gathered and sold in city markets. Lapwings are only accidental in North America. See PLOVER. D.L.

Scientific Name. The lapwing belongs to the family *Charadriidae*. Its scientific name is *Vanellus vanellus*.

LARAMIE, *lair' a me*, WYO. See WYOMING (back of map).

LARBOARD. See SHIP.

LARCENY, *lahr' seh nie*, a form of theft, consists in taking away the personal goods of another without his consent, with the definite intent to deprive him of his property. Usually, larceny is divided into two classes, *grand* and *petit*. In grand larceny, two degrees are sometimes distinguished, as follows: the first, larceny in the night, or larceny of property worth more than \$500; the second, larceny of property worth more than \$25 (in some jurisdictions \$15) and less than \$500. Petit larceny includes taking of property of less than \$25 (or \$15) in value. Grand larceny is usually punished by imprisonment, petit larceny by fine or imprisonment. Until 1827 some forms of larceny in Great Britain were punishable by death. There are degrees of difference between larceny and robbery, burglary, and embezzlement. (See the articles under those heads.)

LARCH, the name of a genus of cone-bearing pinaceous trees that differ from most other members of the pine family in shedding their needles in the autumn (see EVERGREEN). That is, the larches are deciduous trees (which see). The species are found throughout the north temperate regions. The *American larch*, called *tamarack* in the Middle and Western United States, and *hackmatack* in Canada, is the tree whose tough roots were used by the Indians to bind up their canoes, as Longfellow tells us in *Hiawatha*:

Give me of your roots, O Tamarack!
Of your fibrous roots, O Larch-Tree!
My canoe to bind together
So to bind the ends together
That the water may not enter,
That the water may not wet me.

This larch is a slender conical tree, varying in height from fifty to ninety feet. The bark, which is used in tanning and dyeing, is thin and scaly. The needles are clustered in little sheaths on short spurs. Flowers of two sorts

come from some of the buds, while others produce crowded tufts of needles. The cones are less than one inch long, and are a bright chestnut-brown. They remain on the trees after the leaves are gone. Larch wood is hard and strong, and is used for telegraph poles, railroad ties, fence posts, and as firewood.

The *common larch*, which is often planted in the United States as an ornamental, is native to the Old World. This beautiful tree has larger cones and more abundant foliage than the American larch. Its wood contains a great deal of resin, but does not burn readily, and is tough and durable. Timbers of it in

old French castles have been found perfectly sound when stones of the structures were crumbled and decayed. See TAMARACK. G.M.S.

Scientific Names. The larch genus, known scientifically as *Larix*, belongs to the family *Pinaceae*. The American larch is *Larix laricina* or *americana*; the larch of the Old World is *L. decidua* or *europaea*.



THE LAPWING



THE LARCH

Tree and detail of branch.

LARCOM, LUCY (1826-1893), an American poetess, was born at Beverly, Mass. After three years in school, she became a factory employee in the cotton mills at Lowell. Her contributions to the *Lowell Offering*, a periodical for the mill employees, attracted the attention of John Greenleaf Whittier, with whose

assistance she afterward compiled *Child-Life and Songs of Three Centuries*. For three years she attended the Monticello Female Seminary in Illinois, then returned to Massachusetts and taught in the Norton and Boston schools. In 1865 she became assistant editor, and in 1866 editor, of *Our Young Folks*, a magazine since absorbed by *Saint Nicholas*.

[Her writings include *Similitudes*, *Ships in the Mist*, and *Wild Roses of Cape Ann*.]

LARD, or hog fat, is a substance used extensively for cooking, for soap-making, as a lubricant, and in the preparation of ointments. It is extracted from the fatty parts of the hog by melting in kettles. When brought to a high temperature, it is strained, then cooled by refrigeration and clarified. Lard intended for culinary purposes—for making of biscuits, pie crust, and other pastry, and for frying foods of various kinds—is run into pails just before it solidifies. The finest lard, called *leaf lard*, obtained from the fat around the kidneys of the hog, is used both in cooking and in the preparation of oils and ointments. When the fat is subjected to pressure, a substance known as *olein* is liberated in the form of lard oil, which is used extensively as a lubricant.

On the farm, the hog fat is cut into small pieces, put into kettles over bonfires, and heated until the grease is entirely dissolved from the tissues, or "cracklin," when it is run into vessels to cool. The fat around the kidneys, which is removed from the hog in large, irregularly shaped pieces, is often bought by the housewife who prefers to render it into lard herself, so that she may be sure that the cooking fat is not adulterated. She wastes very little in buying leaf lard, as the tissues, which are left after the lard is extracted, weigh very little.

Lard is composed of *olein*, *stearin*, and *palmitin*, in the proportion of sixty-two per cent of olein to thirty-eight per cent of the other ingredients. When fresh, good lard has a mild flavor and pleasant odor.

Olein, the glyceride of oleic acid (see article **FAT**). Soft fats like lard have a larger percentage of olein than suet, for example, and olein forms the larger part of oils such as olive, cod-liver, etc. By the treatment of olein with hydrogen and metallic nickel, a process which converts olein into stearin, many former waste products can now be utilized, for solid fats, particularly stearin, are more valuable com-

mercially than animal or vegetable oils. By this process, cottonseed oil may yield a stearin which becomes a substitute for lard, and low-grade fish oils may furnish raw materials for soap of fine quality.

Palmitin, the glyceride of palmitic acid, which is present in nearly all fats (see **FAT**). Important sources of palmitin, which is a solid fat, are palm oil, from which it takes its name, Japanese beeswax, and olive oil. It is also used in the making of soaps and candles.

Stearin. See **STEARIN**.



Photo: Brown Bros.

LUCY LARDNER

LARDNER, RING W. (1885-), an American humorist, born in Niles, Mich., and educated in the local high school and at Armour Institute, Chicago. He began his career as a reporter on the South Bend (Ind.) *Times*, then became a sporting editor and writer on papers in Chicago, Boston, and Saint Louis. From 1913 to 1919, he conducted a sporting department in the Chicago *Tribune*, entitled *In the Wake of the News*. For several years he had contributed humorous articles to various publications, and in 1919 he resigned his *Tribune* post and contracted to furnish stories to be syndicated.

Lardner has a literary style peculiarly his own; his language is that of the streets, but is never offensive, and his use of current slang is apt and witty. His characters are usually of the ignorant, though not vulgar, class, and are often portrayed as egotistical. Of this type is the hero in his play *Elmer the Great*, written in collaboration with George M. Cohan, and successfully produced in 1928. Another of Lardner's literary activities is the daily column which he conducts in the New York *Tribune*, called *Ring's Side*.

Some of His books. One of his early popular series was *You Know Me, Al*, the chronicles of a baseball pitcher with a high estimate of his worth. Other characteristic works include *Bib Ballads*, *Gullible's Travels*, *Own Your Own Home*, *Treat 'Em Rough*, *The Real Dope*, *My Four Weeks in France*, *The Young Immigrants*, *Symptoms of Being 35*, *The Big Town*, *How to Write Short Stories*, *What of It*, *The Love Nest*, *The Story of a Wonder Man*, and *Round-Up*.

LAREDO, lah ra' doh, TEX. See **TEXAS** (back of map).

LARES AND PENATES, la' reez, pe na' teez, in ancient Roman mythology, the deities who were supposed to watch over the destinies of the family and state, and who were usually represented by small images in the hearth or in a special shrine. These images were the most cherished possessions of a household, and a place was always provided for them in a new home before the comfort of the family was considered. The Lares were supposed to be the spirits of deceased mortals who returned to watch over their families and friends, whose homes they guarded from exterior dangers; the Penates had always existed as deities, and protected the interior of the home. Originally, the



THE HORNED LARK

Photo: Visual Education Service

divinities were separate and distinct, but later were connected, to denote the worship of ancestors and the hearth. In modern times the terms are commonly used to designate one's home or household possessions.

LARGEST CITIES. See CITY.

LARGHETTO, *lahr get' toh*. See MUSIC (A Course of Lessons).

LARGO. See MUSIC (A Course of Lessons).

LARISSA, *lah' ri' sah*. See THESSALY.

LARK, a family of birds found in Europe, Asia, Africa, and America, noted for sweet singing and remarkable powers of flight. About 100 species have been identified, best known of which are the *skylark*, which nests throughout Europe and the temperate parts of Asia, and the *horned lark*, the only member of the family native to America. The *titlark*, or *pipit*, and *meadow lark* are not true larks, but belong to entirely different families. See MEADOW LARK; PIPIT.

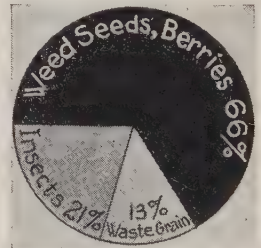
The skylark, whose song may be heard when the singer itself is lost in the depths of the sky, is the theme of one of Shelley's poems. Hardly more joyous is the singing of the skylark than the poet's melodious lines:

Hail to thee, blithe spirit!
 Bird thou never wert—
 That from heaven or near it
 Pour'st thy full heart
 In profuse strains of unpremeditated art.
 Higher still and higher
 From the earth thou springest,
 Like a cloud of fire;
 The blue deep thou wingest,
 And singing still dost soar, and soaring ever singest.

This bird was also the inspiration of a beautiful painting by the French artist Jules Breton—*The Song of the Lark*. It now occupies an honored place in the Art Institute of Chicago; a faithful halftone reproduction appears in these volumes (see BRETON, JULES ADOLPHE).

This sweet songster is a modest little bird, about seven inches long, clothed in a yellowish-brown coat streaked with dark brown. It is dull white on the under parts. It has the peculiar foot structure characteristic of the lark family, the hind toe being provided with a long, straight claw. It usually nests in the open field, laying four or five dull-gray eggs, marked with olive-brown, and it raises two broods a season. Attempts to naturalize the skylark in America have not been successful.

The horned larks are found in the northern parts of both the eastern and western hemispheres. They breed throughout Canada and the United States, except in the South Atlantic and Gulf states, and in winter may be seen throughout the United States and in Mexico. These birds are about seven and one-half inches long.



THE HORNED LARK'S FOOD

Their plumage is streaked grayish-brown, and their distinguishing marks are a black patch on the breast and small hornlike tufts of dark feathers above and behind the eyes. In the breeding season, the males soar high in the air, like the skylark, pouring forth their simple song while on the wing; at other times they sing while sitting on the ground. They sing as early as the middle of February, and may also be heard on warm moonlight nights in spring. These larks feed on weed seeds, waste grain, and various insect pests, including the May beetle, clover-leaf weevil, potato-stalk borer, nut weevil, and chinch bug, and are therefore valued aids to the farmer. Grasshoppers and cutworms are also a favorite food with them.

D.L.



LARVAE

(a) Butterfly; (b) beetle; (c) mosquito; (d) frog.

Scientific Names. True larks belong to the family *Alaudidae*. The skylark is *Alauda arvensis*; the horned lark is *Otocoris alpestris*.

LARKSPUR, the common name of a genus of summer-flowering herbs of the buttercup family, found in the cool regions of both hemispheres.

The name is derived from the odd formation of the flower parts, the upper sepal having a long, curved spur, and the other five being grown together. The petals, too, are irregular in form. About 100 species have been described, many of which have been cultivated as ornamental plants. The flowers are blue, white, or pink. One species grows in great profusion in California. Some species are extremely poisonous to cattle, and many cases of larkspur poisoning have been reported from the Western ranges. Sheep are practically immune, and horses only slightly susceptible. A species cultivated in Europe, containing several alkaloids, is used for medicinal purposes.



LARKSPUR

B.M.D.

Classification. Larkspurs belong to the family *Ranunculaceae*. They constitute the genus *Delphinium*.

LARKSVILLE, PA. See PENNSYLVANIA (back of map).

LARVA, *lahr' vah*. In the life history of many small creatures, the first form of life which appears from the egg is vastly different from the parent. In that early stage it is called a larva, which is a Latin word meaning *ghost*, *specter*, or *mask*. The plural form of the word is *larvae*. The term is used in the sense that the creature in that stage hides, or masks, the real character of the finally perfect individual. It was first applied to insects only, but now also covers the early form of any animal in which there is little resemblance to the parent. For example, the *tadpole* is the larva of the frog. The larva of a moth or a butterfly is called a *caterpillar*; that of a fly is called a *maggot*; that of a beetle is known as a *grub*.

The principal duty of a larva is to eat and grow, and as a result, considerable harm is done to vegetation by certain species, such as the corn borer and the cotton-boll weevil. At different points in their development, larvae outgrow their skins and shed them. Finally, some enter what is known as the *pupa*, from which they at last emerge as perfect insects.

W.J.S.

Related Subjects. The reader is referred in these volumes to the following articles:

Butterfly	Insect (The
Caterpillar	Developing Insect)
Frog	Metamorphosis
	Pupa

LARYNGITIS, *lair in ji' tis*. This term, like all medical terms ending in *itis*, signifies an *inflammation*—in this case, of the voice box, or larynx. Laryngitis is always accompanied by more or less hoarseness and cough, the latter caused by tickling or irritation. The hoarseness may continue only for a short time, as in public speakers who use the voice much

or incorrectly; or it may be persistent, chronic hoarseness, which exists in consumption and syphilis of the larynx. Between these two are all grades of severity, and the causes are many and varied.

The healthy throat may be overworked and ready to become inflamed by a cold; the voice may be overtaxed, as in public speaking; the throat may be irritated by alcoholic beverages, tobacco, condiments, like pepper and vinegar, or by inhalation of dust, gas, or vapor, as a necessary accompaniment of one's occupation. As a result of these conditions, ulcerations are formed on the throat.

Acute laryngitis may result from an acute infection, as when a cold in the nose spreads to the larynx, or when diphtheria infects the larynx, either primarily or by spreading from elsewhere. Oedema of the glottis is a form of acute laryngitis accompanied by a good deal of swelling, especially in the region of the vocal cords. It may be rapidly fatal. Chronic laryngitis may result from infection with tubercle bacilli or from other infections.

Whenever a condition of hoarseness persists, the victim should at once consult a reliable physician. Rest of voice, hot drinks, hot applications, and inhalation of medicated steam will usually relieve mild cases. W.A.E.

LARYNX, *lair' ingks*, the organ of the body by which the voice is produced. It is boxlike in shape and composed of nine sections of cartilage. It lies in front of the windpipe, and immediately below the hyoid bone. This organ communicates above with the pharynx and below with the windpipe; thus, every breath of air which we take must pass through the larynx in order to get to the lungs, and it must follow the same path to get out again. If we so will it, this air in passing out will cause the production of sound by means of the vibration of the vocal cords, which are part of the larynx.

Of the cartilages which compose the larynx, the most important are the *thyroid* and the *cricoid*. The former consists of two winglike plates which constitute the side walls of the larynx and meet in front to form the projection called the *Adam's apple*. The cricoid cartilage is shaped like a signet ring, its broad side forming the back wall of the larynx. The voice is produced by means of the *true vocal cords*, two glistening white bands of elastic tissue controlled by small muscles and stretching between the upper front edges of the cricoid cartilage and the inner front wall of the thyroid. Between the true vocal cords is an opening known as the *glottis*, and above and lying parallel with them are other folds of membrane, the *false vocal cords*, so called because they have no share in voice production.

The sounds produced in talking or singing occur, as we have said, when the true vocal

cords vibrate as air rushes through the voice box. High notes are produced when the cords are tightly stretched, while deep, rumbling tones indicate a slackening of the elastic bands. An adult male has longer cords than an adult female, and this is true also of the glottis. The larynx of a boy who is approaching maturity undergoes rapid growth, a process which gives him a "cracking" voice. See LARYNGITIS; VOICE. K.A.E.

LASALLE, *lah sal'*, ILL. See ILLINOIS (back of map).

LA SALLE, RENÉ ROBERT CAVELIER, Sieur de (1643-1687), one of the greatest French explorers in America. He worked not

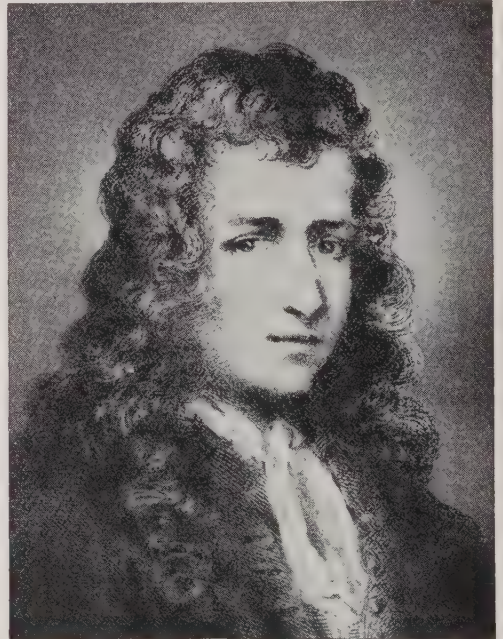


Photo: Brown Bros.

LA SALLE

for personal gain but for the enlargement of French possessions in the New World. The annals of exploration show no more remarkable example of indomitable courage and unflinching resourcefulness.

La Salle was born at Rouen, France, of a well-to-do family. At the age of twenty-three, he emigrated to Canada with the intention of engaging in the fur trade. He acquired a tract of land eight miles above Montreal and built a trading post, but the tales of Indians with whom he came in contact aroused his interest in the great unexplored region to the southwest. He was particularly interested in a story of a great river, which the Indians called the Ohio, that flowed south to the sea. Supposing this to be the long-sought route to the Pacific, he sold his land in 1669 and started on a tour of Western exploration, in company



Photo: Visual Education Service

THE BASIS OF THE FRENCH CLAIM TO LOUISIANA TERRITORY

La Salle taking possession of Louisiana, from a spot near the mouth of the Mississippi River. [Reproduced from an old painting.]

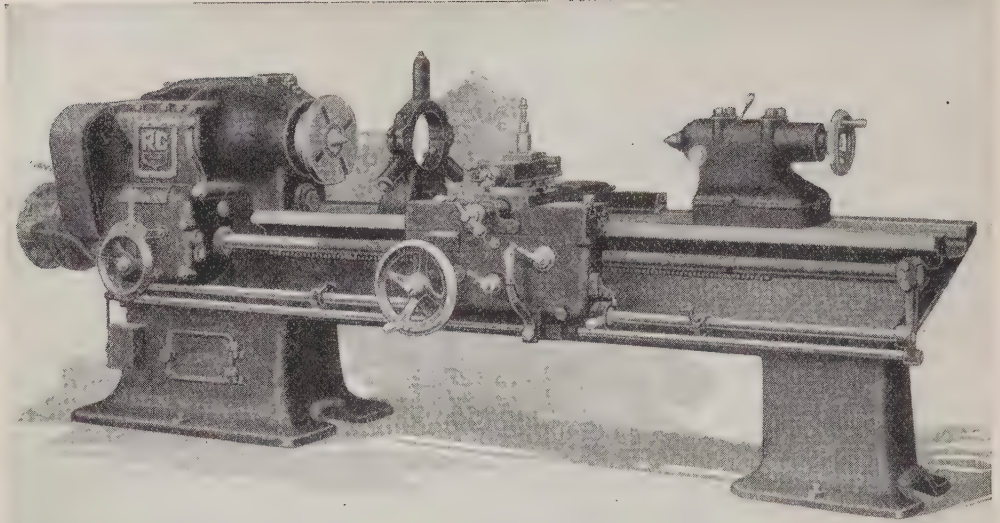
with a party of missionaries bound for the upper Great Lakes. He soon left the party, however, and with a few followers proceeded southward. It is reported that he discovered the Ohio River and descended it as far as the rapids at Louisville, but his biographers are not agreed upon this point. Within the next two or three years, La Salle traveled the length of Lake Michigan, crossed to its western shore, and explored the valley of the Illinois River.

In 1673, on recommendation of Count Frontenac, governor of Canada, he obtained from the French court a title of nobility and the grant of a tract of land which included Fort Frontenac, on the site of the present city of Kingston, Ont. Had La Salle remained there and engaged in the fur trade, he might have become wealthy, but he was moved by a larger purpose. The rich country of the Illinois appealed to him; he saw in it the site of a future empire, which in time might exceed the home country in wealth, and was ambitious to acquire and develop this vast territory for France. Accordingly, in 1677, he went to Paris, and laid his plans before the court. He

was received with honor, and many of his requests were granted, with the provision, however, that his project be carried out without expense to the government.

La Salle's enterprise aroused the opposition and jealousy of the Canadian fur traders, because, should it succeed, it would deprive them of a part of their revenue, but this did not hold him back. He returned to Canada in 1678, and the following winter built, near Niagara, the *Griffin*, the first sailing vessel placed upon the Great Lakes. In the summer of 1679, the *Griffin* sailed to the Strait of Mackinaw, but was lost on the return voyage.

During the next three years, La Salle descended the Mississippi to its mouth, and there took possession of the entire Mississippi Valley for France, naming the region Louisiana, in honor of his king, Louis XIV. This included much of what later formed the Louisiana Purchase. In 1680, on the Illinois River above the present site of Peoria, he established Fort Crèvecoeur, the first rude settlement of white men in the present state of Illinois. Two years later, Fort Saint Louis was built upon a



A GEARED-HEAD ENGINE LATHE

bluff of the Illinois River, near the present village of Utica. Around this fort La Salle gathered and maintained for twenty years the largest confederation of Indian tribes ever controlled by a white man for so long a period. The bluff upon which the fort was built is now known as *Starved Rock* (which see), and is in the center of a state park.

Having established his fort and placed it in charge of his lieutenant, Tonty, La Salle again went to France to secure means and people for establishing a colony at the mouth of the Mississippi. In 1684 he sailed for the Gulf of Mexico. The expedition was embarked on four vessels, and included a hundred soldiers, besides carpenters and colonists, with a good store of supplies. However, when the ships reached their destination, La Salle mistook Matagorda Bay for the mouth of the Mississippi, and the colonists were landed at that point. There was dissension between La Salle and the captain of the fleet, and the latter departed before the mistake was discovered. La Salle saw that his colony was doomed unless assistance could be procured, and with a few followers he heroically set out on foot for Canada, to obtain the necessary relief. On the way he was treacherously shot from ambush by one of his followers.

La Salle was a man of great vision and untiring energy, but he lacked the tact necessary to enable him to hold his followers loyal to his cause. During his entire career he faced opposition and obstacles which would have overwhelmed one of less energy. "It is easy," says Parkman, "to reckon up his defects, but it is not easy to hide from sight the Roman virtues that redeemed them. America owes him an

enduring memory; for, in his masculine figure, she sees the pioneer who guided her to the possession of her richest heritage." His name is perpetuated in a county of Northern Illinois, and in a thriving city of that county, situated on the Illinois River, ninety-nine miles southwest of Chicago.

LASSA, *lah' sah*, another form of Lhasa, capital of Tibet. See **TIBET**, subhead.

LASSEN, *las' en*, **VOLCANIC NATIONAL PARK**. See **PARKS**, **NATIONAL**; **VOLCANO**.

LAT, a gold franc, the standard of currency in Latvia. See **LATVIA** (Government).

LATENT, *la' tent*, **HEAT**. See **STEAM**.

LATERAN, *lat' ur an*, the cathedral church of the Pope of Rome, which ranks higher in dignity than any other Roman Catholic church in the world. It is erected on the site of the palace of Plautius Lateranus, which was confiscated by the Emperor Nero and later came into possession of Constantine the Great. He presented it to the Catholic Church in 312, and the first church structure was built on the grounds twelve years later, by Pope Sylvester I. This was destroyed by an earthquake in 894, and the second and third churches were burned. Urban V made the fourth restoration in 1362, and the edifice has since then undergone several modifications.

Five general councils, known as the famous Lateran councils, have been held here. At the Catholic Council of 1215, publication of banns of marriage was ordered. The present Lateran palace, which was built about 1580, was the residence of the Popes until Avignon, France, was made the temporary seat of the Papal court, but since the return to Rome, they have lived in the Vatican. The palace contains

two important museums, which, together with the church, were presented to the Papacy in 1871 by the Italian government. Pope Leo XIII and many of his predecessors are buried in the Lateran. See POPE; BANNS OF MARRIAGE.

LATEX, *la' teks*, the milky juice of the rubber plant. See RUBBER AND RUBBER MANUFACTURE.

LATHE, *layth*, a machine for working wood or other substances by rotating them before a tool held at rest. Such round objects as chair legs are fashioned on a lathe. Lathes are used for cutting, polishing, filing, engraving, and similar operations. The essential parts are the frame, or bed; the poppets, which support the object; and the rest for the tool. The space between the poppets can be adjusted to objects of varying lengths, and the left-hand poppet, connected with the source of power, forms the rotating head stock. The tool rest is clamped to the bed between the two poppets. In the case of hand-operated machines, the tool is held in position by the turner; the larger machines are now driven by steam or electricity. Lathes for turning wood are operated at greater speed than those used for brass or iron.

LATHROP, *la' thrup*, JULIA CLIFFORD (1858-), an American social worker who became nationally prominent in 1912, when President Taft appointed her chief of the Children's Bureau, a division of the Department of Labor. This was the first time that a woman had been placed in charge of a Federal bureau. Miss Lathrop was born in Rockford, Ill.; she studied at Rockford College, and in 1880 was graduated from Vassar College, of which she is one of the trustees. For many years after 1889, she was associated with Miss Jane Addams at Hull House, Chicago, where she gave much of her time to encouraging coöperation between citizens and official agencies for the relief of harmful social conditions.

Miss Lathrop had long experience in social work before she became nationally known; for twelve years she was a member of the Illinois State Board of Charities, and she assisted in establishing the Chicago Juvenile Court and the Chicago School of Civics and Philanthropy. She has also been active in the movement for the political advancement of women. In 1925 she was appointed assessor on the Child Welfare

Committee of the League of Nations. See CHILDREN'S BUREAU; HULL HOUSE.

LATIMER, HUGH (1490-1555), an English reformer and martyr, one of the divines appointed by the University of Cambridge to investigate the legality of Henry VIII's marriage with Catharine of Aragon (which see). By declaring for the king, he secured the favor of Henry VIII, who appointed him one of his chaplains. He became bishop of Worcester in 1535, but, unwilling to accept the Six Articles, which he thought favored Roman Catholicism, he resigned his bishopric in 1539, and lived in great privacy for six years. At the end of that period, he was confined in the Tower.

On the accession of Edward VI, Latimer was released, but when Mary came to the throne, he and other reformers were arrested and imprisoned. He was confined in jail for more than a year, feeble, sick, and worn out by long-endured hardships, but his enemies would not wait for him to die. Summoned, with Ridley, before certain commissioners who were appointed to judge the two reformers, he was condemned to be burned at the stake. When brought to the place of execution, opposite Balliol College, on the 16th of October, 1555, he exclaimed to his companion, "Be of good comfort, Master Ridley, and play the man; we shall this day light such a candle, by God's grace, in England, as I trust shall never be put out." See RIDLEY, NICHOLAS.

LATIN AMERICA. See SOUTH AMERICA.

LATIN CROSS. See CROSS.

LATIN EMPIRE. See BYZANTINE EMPIRE.

LATIN LANGUAGE, a language which belonged originally to the central Italian tribe of the Latins, but which became, with the spread of Roman influence, the dominant tongue of the ancient world. It belongs to the Indo-European family, and was one of a group of related languages spoken in ancient Italy. When scholars first began to give attention to problems presented by philology, they assumed a close connection between Latin and Greek—closer than between other members of the Indo-European family. Consequently, they argued that there must have been a single race from which both Greeks and Italians were descended. Closer study in recent years has shown, however, that no such close relationship exists, and that Latin is nearer to the Celtic than to any other tongue (see CELTS).

The Three Periods of Latin. The history of Latin as a living language divides itself into three periods: the *preliterary*, which extended from the earliest times to the beginning of Latin literature, about 240 B.C.; the *literary* period, from 240 B.C. to about A.D. 170; and the period of *decay*. In its earliest period, which is represented by inscriptions and a few manuscripts, Latin was a crude, undeveloped lan-



JULIA LATHROP
First head of the Children's
Bureau of the United
States.

guage, incapable of expressing the thoughts of a people in a high state of civilization. During the third and second centuries B.C., the change from a mere rustic dialect to a literary language took place, the poet Ennius having a great part in its development; and the so-called Golden Age (80 B.C.—A.D. 17) saw Latin brought to its highest point of perfection. Cicero and Caesar in prose, Vergil and Horace in poetry, showed what majestic effects might be achieved with this comparatively new medium. Throughout the later literary period, in the hands of writers whose chief striving was after ornament and over-elaboration, Latin lost the simplicity which had been its chief charm in the works of the great authors mentioned above. Its vigor departed, the decline was steady, and by the third century A.D., literary Latin could scarcely take rank as a living language.

Languages Derived from Latin. Latin differed from most other languages in that it had no dialects, in the ordinary sense of the term. There was, however, developing side by side with literary Latin, a vernacular, or localized Latin, which differed in many respects from the more formal speech. The distinction grew wider through the centuries, as the classical Latin declined and the speech of the common people became more vigorous; and by the fifth century, the *Lingua Romana*, or language of Rome, as it was called, had entirely displaced the pure Latin. It was from this speech of the people that the Romance languages of Europe were derived—French, Italian, Spanish, Portuguese, and Rumanian. The Latin which was used throughout the Middle Ages in the schools and monasteries of Europe, as well as in official documents, was a deteriorated form of the early literary Latin. Modern English has many words which are derived directly from the Latin, or indirectly, through the French or Italian. A few examples of such derived words are given in the article PHILLOGY.

Alphabet and Pronunciation. The Latin alphabet was derived from the Greek, which was brought to Italy by Greek colonists who settled in the southern part of the peninsula. In classical times, the alphabet had twenty-three letters, the *j*, *u*, and *w* of the English alphabet not being present. The letters did not in all cases have the same phonetic value as the Greek, and in some instances they differed in sound from their English derivatives. The "Roman method" of pronunciation, which is used extensively in schools, is an attempt to approximate the original pronunciation of Latin, and differs from the "English method," which pronounces Latin words just as though they were English.

Like the Greek, Latin was an inflected language (see INFLECTION), though it was far

from having as many verb forms as had Greek, especially in its early stages. In certain qualities, however, it ranked high, notably in concreteness and in precision of expression. The Romans, compared with the Greeks, were an unimaginative people, and it is natural that their language should have been better adapted to prose than to poetry, but in the hands of such a master as Vergil, it was shown to be capable of a dignity and a sonorousness which have rarely, if ever, been equaled. While Greek excelled as the language of poetry and the arts, the Latin language was a perfect medium of expression for the terms of law and government.

As a Study in Schools. Since the Renaissance there has never been a time when Latin has not been studied in the schools, and throughout the medieval and much of the modern period, it was the chief study. A young man in his early college years was expected not only to translate fluently the great masters (that was really preparatory school work), but to write original Latin essays and poems. Of late years, much opposition has grown up to the required study of this "dead language," and in many schools and colleges, especially in the United States, less stress is now laid on Latin. By time-honored rule, no college student in the past could earn his A.B. degree without Latin as a considerable part of his prescribed course of study. Since the introduction of the elective system, however, this requirement has been generally abandoned in the United States, although in most English and other foreign universities it is still maintained.

Many people are convinced that the study of Latin, by reason of the precision and logical exactness of the language, affords educational values which are important to the developing mind. Some of these values are the abilities and habits which assist in the study of other subjects, and which later assist one in attacking the problems of practical life. Examples of the values claimed for the study of Latin by advocates of the subject are the ability to derive the meanings of English words from the related Latin, development of the habit of thoroughness and the power of analysis, and growth of an appreciation of Roman civilization as a source of many influences in modern life.

Whatever weight may be given to these claims, there are direct results from the study of Latin which are unquestioned. One of these is the background in grammar and vocabulary which it affords for other living languages, including English. The fact that so much of English is derived either directly or indirectly from Latin makes a knowledge of Latin a distinct aid to vocabulary-building, and the logic of its grammar aids in an understanding of English grammatical form. Its

DE OVOD
CVLSNONVIDIT
INCORHOMINIS

SPES
NON deISTO
MUN doEST
NTRA

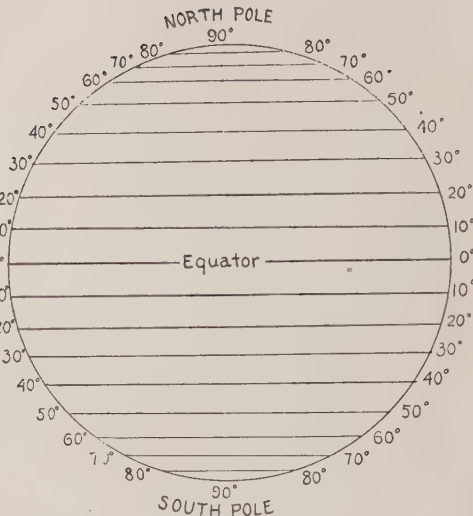
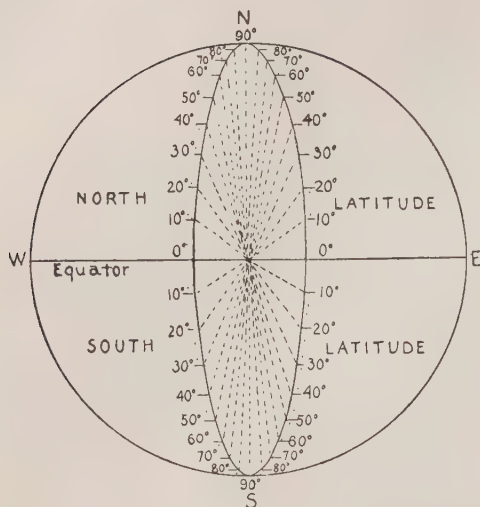
INCPNTCAI
DIALOGEII
UBIMULTITUDOHOMI
NUMINSPERATA OCCURRI
audire gallum descimar
tiniuitatibus locuturo
Ubi puellam duodecennem ab
uteromutam curauit
Ubi oleum sub eius benedictio
ne creuit et ampulla cum o
leo quod benedixerat super

caur totodhaquod nominatur.
caluariat-locus

Gauderunt bibere unum
pelle matum & cum gustass
uoluit bibere

Postquam cruci pperunt eum
diuiserunt sibi uesimenta ei
sortem mittentes ut plerique
dictum est per proptiam ch center
diuiserunt sibi uesimenta mea
superuestem meam misserunt
sortem. Sedentes seruabante
Gin possuerunt super capu
eius causam ipsius scriptu
hic est rex iudeorum

Deposicio quid est? Pars ora
tionis que pposita alijs par
tibus orationis signification
eaz aut completer, aut inuicar
aut inuicit. Depositioni quot accidunt
Chuz. Quid? Calus nri. Quot calus
Duo: Qui? Pluris i aduersis. Da ppo
sitiones acti calus: ut ad. apud. ante
aduersum. nis. extra. circa. circa. contra.
erga. extra. inter. intra. infra. iuxta. ob
pone. per. ppe. ppter. scdm. post. trans
ultra. preter. supra. trinter. usq. scuo
penes. Quo dicimus eni? Ad patrem
apud. villa. ante edes. aduersum inuini
ros. nis. renu. circa foru. circa vicino
circa templu. contra hostes. erga pmi
quos. retra terminos. inter naues. in
tra menia. infra tectu. iuxta macellum
ob auguriu. pone tribunal. p parietem
p fenestra. ppter disciplinam scdm fo



DIAGRAMS SHOWING LATITUDE

value in connection with the study of any of the Romance languages, of which it is a parent, is obvious.

The Latin classical writings are among the world's greatest literature and may all be read in excellent translations. One who does this must, of course, miss some of the qualities which are inherent in the original of a piece of literature. See ARYAN; LANGUAGES OF THE WORLD.

E.U.G.

Related Subjects. A valuable survey of Latin literature may be obtained from a study of the following classic writers, whose biographies are given in these volumes:

Caesar, Caius Julius	Ovid
Catullus, Caius Valerius	Plautus, Titus Maccius
Cicero, Marcus Tullius	Pliny (Elder and Younger)
Horace	Quintilian
Juvenal	Sallust
Livy	Seneca, Lucius Annaeus
Lucretius	Tacitus, Publius Cornelius
Martial	Terence
Nepos, Cornelius	Vergil

LATIN LEAGUE. See ROME (External Expansion).

LATINUS, lah ti' nus. See AENEID.

LATITUDE, a term in geography used to designate the distance of any point on the earth north or south of the equator. Such distance is measured in degrees, the equator being 0° and each of the poles 90° from the equator; that is, the distance from the equator to a pole is one-fourth of a great circle drawn around the earth and passing through the poles. Places north of the equator are said to be in *north latitude*; those south of it are in *south latitude*. *Parallels of latitude* are imaginary lines drawn around the globe or on maps parallel to the equator, the important ones being the *Arctic* and *Antarctic* circles and the *tropics* of *Cancer* and *Capricorn*. It is worthy of note that the most advanced civilization on the

earth lies between 25° and 60° north latitude, and that the earth's greatest cities in the northern hemisphere are not many degrees from the 40th parallel in North America or the 50th parallel in Europe.

A degree of latitude at the equator is equal to about sixty-eight and seven-tenths common miles; at latitude 40° a degree is nearly equal to sixty-nine miles. The length of "the middle degree," that is, at places in latitude 45°, is 364,606 feet, a little over sixty-nine miles. The form of the earth being an oblate spheroid, it is flattened toward the poles; hence the greater length of a degree in miles at the middle distance between the equator and the poles.

The distance in degrees east or west of the prime meridian is called *longitude*.

R.H.W.

Related Subjects. The reader is referred in these volumes to the following articles:

Antarctic Circle	Longitude
Arctic Circle	Longitude and Time
Degree	Pole
Equator	Tropics
Geography	Zone

LATIUM, la' shih um, in ancient geography, was that part of Central Italy along the coast of the Mediterranean Sea, southeast of Etruria and northwest of Campania. Its chief cities formed a league which warred with the Romans from 340 to 338 B.C., after which it was incorporated with Rome. Its location nearly coincides with the modern Campagna di Roma, which surrounds the city of Rome, but the ancient province was much more highly cultivated and more thickly peopled. Latium was occupied by the Latins, Hernicans, Volscians, Auruncans, and the Aequi. See map, page 3889.

LATONA, lah toh' nah, or **LETO**, mother of Apollo and Diana. See APOLLO; DIANA; NIOBE.

LA TOSCA, *lah tos' kah*. See **OPERA** (Some of the Famous Operas).

LA TRAPPE MONASTERY. See **TRAPPISTS**.

LA TRAVIATA, *lah trah ve ah' tah*. See **OPERA** (Some of the Famous Operas).



ANCIENT LATIUM

(1) Etruria; (2) Liguria; (3) Gallia Cisalpina; (4) Venetia; (5) Umbria; (6) Picenum; (7) Sabini; (8) Aequi; (9) Freutani; (10) Samnium; (11) Apulia; (12) Campania; (13) Lucania; (14) Peucetii; (15) Calabria; (16) Bruttii

LATROBE, PA. See **PENNSYLVANIA** (back of map).

LATTER DAY SAINTS, THE CHURCH OF JESUS CHRIST OF. See **MORMONS**; **SMITH, JOSEPH**.

LATTER DAY SAINTS, THE REORGANIZED CHURCH OF JESUS CHRIST OF, a religious denomination with headquarters at Independence, Mo. After the death of Joseph Smith, a reorganization of the Church was effected by those remaining in the Mississippi Valley, who had refused to follow Brigham Young or accept such doctrines as polygamy, blood atonement, and Adam-God. These adhere to the doctrine and follow the practices of the Church from its inception in 1830, and maintain that its organization is a legal continuation of the Church of Jesus Christ of Latter Day Saints, as originally organized.



FREDERICK M. SMITH
President of the Reorganized Church of Jesus Christ of Latter Day Saints since 1914.

This claim is upheld by the fact that many individuals and whole congregations of the original Church took part in this reorganization, and were accepted on their original baptism. This claim was also upheld in the United States Circuit Court on the only occasion that it was ever submitted to a court for consideration as a matter placed at issue. This suit was for the possession of the Temple lot at Independence, Mo. The decision was later modified by the higher court so far as possession was concerned, on the ground of laches (neglect to do a thing at the proper time), but the vital part of the original decision, that polygamy and such doctrines were not a part of the teachings of the Church prior to



LATTER DAY SAINTS' AUDITORIUM
Erected in 1926 at Independence, Mo.

the death of Joseph Smith, and the decision on succession, were not reversed. The teachings of this Church are of the mission of Jesus Christ, and restoration of the New Testament Church with its officers, spiritual gifts, and teachings.

Joseph Smith, the son of the founder, was chosen president in 1860, and upon his death, in 1914, his son, Dr. Frederick M. Smith, was named as his successor. The Reorganized Church has a membership of over 102,000, and has 2,500 ministers. S.A.B.

LATTER DAY SAINTS' UNIVERSITY. See **UTAH** (Education).

LATVIA, *lat' vih ah*, one of the Baltic republics, formerly a part of Russia, which declared itself an independent government soon after the Russian revolution (1917). Although its people constituted a distinct national group, their land had been ruled by a succession of strong European nations for more than four hundred years. It now comprises nearly 25,000 square miles, an area about that of West Virginia, and includes the former Russian province of Courland, four districts of the former Russian province of Livonia, and three districts of the former Russian province of Vitebsk.

The People. The population of Latvia numbers about 2,000,000. Seventy-five per cent of the citizens are native Letts; Russians, Jews, and Germans comprise the majority of

other nationalities. Latvia suffered a heavy loss of population during the World War, but most of the refugees who survived have now returned.

School attendance in Latvia is compulsory, and almost ninety per cent of the population is literate. Besides elementary and secondary schools, there are specialized educational institutions; the former Polytechnic Institute of Riga has been, since 1919, the Latvian University, with more than 6,000 students. Each "national minority"—Jewish, Russian, German, etc.—is allowed to have its own schools, using its own language, with the help of a maintenance fund from the Latvian government. The Latvian language is the tongue in which the schools are conducted, and the study of German or English is required in the middle schools.

The majority of Letts are Protestants, although the district of Latgale is predominantly Roman Catholic, and about 75,000 Letts belong to the Greek Orthodox Church.

The Cities. Only twenty per cent of the population is urban. The chief cities are those with harbors on the Baltic, for Russia has found its easiest route to the sea through Latvia. Commerce and industry before the World War made Riga one of the most important cities of Northern Europe, and Libau is also a trade center. Besides these two, described below, important cities are Dvinsk, Mitau, and Windau.

Riga, *re' gah*, the capital of Latvia and the shipping center of the Baltic region, is situated on the Dvina River about eight miles from the Gulf of Riga. It was seriously crippled by the World War, for it not only lost people and industrial equipment but was severely bombarded. Its population was reduced from a reported number of 525,000 in 1914 to 340,000 in 1928. However, it remains the chief industrial center of Latvia, supports more than 700 manufacturing establishments, and cares for eighty-seven per cent of the country's trade. More than half of the population is Latvian, but Russian is the language commonly used.

Libau, *le' bow*, a fortified Baltic seaport, second in importance to Riga. The city is divided into the old town, typical of the Middle Ages, and a new town, with broad streets and fine squares. Libau is important as a naval station and a commercial port, for its harbor is free of ice at all seasons. It has the largest metal-working factory in Latvia. Population, 61,000.

The Land. The country of Latvia is an undulating coastal plain, with occasional sandy and marshy areas. The climate is temperate, although the winters are severe. There are many lakes and streams, the chief river being the Dvina, on which Riga is built. About one-fourth of the total area is forest land, which is state-owned. The country has no mineral wealth, except some deposits of brown coal in Courland. The resources in water

power of Latvia's rivers are comparatively undeveloped.

Agriculture is the occupation of more than half of the Latvians, and dairy farming and stock-breeding are increasing in importance. Before the war, the bulk of the land belonged to large estates, while most of the peasants were able only to exist as tenants or holders of small farms. The agrarian reform laws of 1920 appropriated the greater part of each of these estates, promised compensation to the owners, and divided this and the State and Church land into small farms; these were made available for the peasants to purchase. The country has become, therefore, a nation of small landholders.

The flax raised on these farms, the butter made on dairy farms, and the lumber from Latvia's extensive forests furnish the bulk of material exported. Rye, oats, barley, and potatoes are other important agricultural products. Fishing is an important industry.

Manufacturing has not yet regained its pre-war status. At the beginning of the German advance, all of the machinery of the factories was removed to Central Russia. Only a small portion was recovered from the Soviet government, and this fact made it necessary practically to build up from the foundations of industry. This phase of economic life is rapidly being restored. Progress is being made in the paper, woodworking, chemical, and textile industries.

Government. Latvia is a republican state, and has a democratic Constitution. Sovereign power is vested in the Saeima, or Parliament, which consists of 100 members elected for three years, on the basis of proportional representation, by Latvian adult citizens. The Parliament elects the President, whose term of office is also three years. He appoints a Prime Minister who forms a Cabinet of ten members, responsible to the Saeima.

The government has been able to place the country on a firm financial basis, and to reduce the national debt appreciably. The *lat*, or gold franc, is the standard of currency.

History. Latvia is one of the oldest countries of Europe. The Letts and their close racial kin, the Lithuanians, have occupied the Baltic region since before written history began. They are members of the Aryan stock, and Phoenician and Roman coins found in their country testify to their existence and contact with the civilized world at those periods. Their territory was disputed from an early date. They were united under the Germans until 1560, when the whole Baltic territory was divided under Sweden, Lithuania, Poland, and Denmark. In 1621 Livonia, or Latvia, was annexed by Sweden, and in 1710 by Russia. By 1795 all of the Baltic nations were under Russian rule, and continued so



Photos: O R O G

In the New Republic. The harbor at Riga, Latvia. At the right is the ancient castle, now used as official residence of the nation's President. Below, the art museum of the republic. 3891

until the Russian revolution during the World War. In spite of constant pressure, however, the Letts kept alive their national spirit and language.

On November 18, 1918, the Latvian republic was proclaimed. Its subsequent "war of liberation" against the Germans and the Bolshevik armies, ended by a peace signed in 1920, only added to the desolation caused by the German advance upon Russia and by the battles of the Eastern front. Latvia emerged with its land devastated, nearly 800,000 of its people wandering as refugees in Russia, and with its industrial plants stripped of their equipment. A Latvian statistician estimated, in 1920, that fifty years would be required to bring the country back to its pre-war status.

Several treaties and trade agreements have been made with neighboring countries, which provide for closer economic contact with the other Baltic states, and the further development of transit traffic with Russia. Latvia was admitted to the League of Nations in 1921.

Related Subjects. The reader is referred in these volumes to the following articles:

Letts Russia (History) World War

LAUD, *lawd*, **WILLIAM** (1573-1645), an English prelate who is remembered for his severity against the Puritans during the reign of Charles I. Shortly after his ordination to the priesthood, in 1601, he openly displayed his contempt for Puritanism, and when, after rising steadily through several high Church positions, he was made archbishop of Canterbury (1633) by Charles I, he cooperated with the king in every possible way to force the Puritan dissenters to conform to the established forms of worship. Proceeding against them by means of fines, imprisonment, and exile, he won the bitter hatred not only of the people as a whole, but of Parliament. His course of tyranny was finally checked when he attempted to force the English Church ritual upon the Scots. In 1641 he was arrested and sent to the Tower, and two years later was condemned to death by Parliament on a charge of treason. In January, 1645, he was beheaded.

LAUDANUM, *law' da num*, a powerful and dangerous fluid preparation, containing forty-eight grains of opium to the ounce. Laudanum is tincture of opium, and is prepared by softening powdered opium in alcohol and straining off the liquid portion. In color it is a dark brownish-red, and the odor is that of opium. It is all too frequently administered as a domestic remedy for pain or sleeplessness by those ignorant of its power. Very small doses given to infants for the purpose of quieting them have proved fatal. A person who has taken an overdose of laudanum should be given an emetic, or the drug should be expelled with a stomach pump. Artificial respiration is often resorted to in desperate cases. Walking people

about and giving them strong coffee as a stimulant are other helpful remedies. At the present time, morphine and codeine are frequently used as substitutes for laudanum. For restrictions regarding the distribution of drugs derived from opium, in the United States and Canada, see **OPIUM**.

Derivation of the Term. Laudanum was so named by the man who first prepared it, the German chemist Paracelsus (1493-1541). The term is derived from the Latin name for a resinous gum.

LAUDER, *law' dur*, **SIR HARRY** (1870-), a Scottish entertainer of wide reputation, whose real name is **MACLENNAN**. He was born in Portobello (now a part of Edinburgh), of humble family, and experienced many hardships in his early life.



Photo: Wide World

SIR HARRY LAUDER

His only opportunity for education was half-time schooling while working as mill boy in a flax-spinning mill in Arbroath. But he had a talent for music, and in spite of poverty and hard work, he managed to become proficient as a singer. He worked for ten years as a coal-miner, but gave his spare time to singing and amateur entertainment. Finally, he determined to adopt the stage as a profession. His first venture, a tour through Ireland and Scotland, was so encouraging that it gave him confidence to continue. He became a success in London, and in 1907 made his first trip to the United States, where he met with an enthusiastic reception. His reputation now firmly established, he made numerous trips through Europe and America, delighting large audiences with his songs and characterizations.

In 1890 Lauder was married to Miss Anna Vallance. Their only son was a soldier in the World War, and in 1917 he lost his life in France. During the following year, his father went about among the British troops, giving his services as an entertainer and doing all that he could to keep up the spirits of the soldiers. In recognition of his efforts for the allied cause, he was knighted by King George in 1919.

Lauder's performances are unique. He appears alone and limits his repertoire to songs in dialect and impersonations of whimsical character. In this field he has not been surpassed. His songs have been given wide circulation by being recorded for reproduction on the phonograph.

[He has written *Harry Lauder's Logic*, *Harry Lauder at Home and on Tour*, *Roamin' in the Gloamin'* (the story of his life), and a Scottish comedy. He composes all the songs and music which he uses in his performances.]

LAUGHING GAS. See NITROUS OXIDE; ANESTHETIC (Types and Drugs Used); ETHYLENE.

LAUGHING JACKASS. See AUSTRALIA (Animal Life).

LAUNDRY. See CLEANING PROCESSES.

LAUNFAL, SIR. See ARTHUR, KING.

LAURA DE NOVES. See PETRARCH.

LAURA SPELMAN ROCKEFELLER MEMORIAL FUND. See EDUCATIONAL FOUNDATIONS.

LAUREATE, *law' re ate*. See POET LAUREATE.

LAUREL, *law' rek*, the common name of a family of trees and shrubs remarkable for their aromatic properties. The laurels include such



THE LAUREL

The laurel branch, and the crown of laurel, "meed of mightie conquerours and poets sage."

well-known medicinal plants as the sassafras, benzoin, and camphor trees. The name is probably most familiarly associated with the *victor's laurel*, or *sweet bay*, of the Mediterranean region, whose graceful evergreen leaves formed the wreaths that crowned the victors in the ancient games (see BAY TREE). The name is also applied to plants of other families, notably the *cherry laurel* and the *Portugal laurel*, both of which belong to the rose family, and to the beautiful *mountain laurel*, a member of the heath family. The latter is described in the article KALMIA.

The Laurel in Legend. In classic mythology, the laurel tree was sacred to Apollo, the sun god. According to the legend, he loved and wooed the beautiful nymph Daphne, daughter of the river god Peneus. Delighting only in woodland sports and in the spoils of the chase, Daphne sought to elude her handsome lover. Though she fled, swifter than the wind, she saw that she could not escape, and so called to her father

for help. Thereupon he changed her into a laurel tree, which was ever afterward sacred to the sun god. See APOLLO. G.M.S.

LAUREL, Miss. See MISSISSIPPI (back of map).

LAURENS, *law' renz*, HENRY (1724-1792), an American statesman of the Revolutionary period. He was born at Charleston, S. C., and early became a conspicuous figure in the patriotic group which opposed British aggression, being one of thirty-eight Americans who signed a petition to dissuade Parliament from passing the Boston Port Bill (1774). In 1775 he became a member of the First Provincial Congress, and was elected president of the Continental Congress in 1777. Laurens was sent to Holland in 1779 to negotiate a commercial treaty, but was captured at sea by the British and imprisoned in London Tower for fifteen months. Twice he refused offers of pardon, for each time it was made a condition that he serve the British ministers. In 1782, with Adams, Jay, and Franklin, he signed the preliminary articles of peace between the United States and Great Britain, but failing health prevented his remaining in Paris for the negotiation of the final treaty.

LAURENTIAN, *law ren' shih-an*, MOUNTAINS. See QUEBEC (Surface and Scenery); also following article.

LAURENTIAN PLATEAU, sometimes called the LAURENTIAN SHIELD, is a vast region in North America, nearly 2,000,000 square miles in area, comprising more than one-half of the total area of Canada. It is shaped roughly like a shield, surrounding Hudson Bay on the east, south, and west, and forming a large part of the great islands to the north. On the east it forms the Labrador peninsula. On the south it extends through the province of Ontario as far as Lake Superior and Georgian Bay. West of Hudson Bay the shield spreads to the northwest, its western edge being not far from and parallel to the Mackenzie River. The highlands of the part of the shield lying in Quebec north of the Saint Lawrence River are frequently called the Laurentian Mountains, but of mountains in the usual sense of the word, there are none.

Oldest Part of North America. When the wrinkling of the earth's crust first caused the land to rise above the water, the first part of North America to appear was the Laurentian Plateau. This was followed by the Appalachian system, and later by the Rocky Mountains system. Between these three mountain masses lay a great stretch of shallow water. The Laurentian Plateau was originally much higher than it is to-day, but heat and cold, rain and snow, and the great glaciers which once covered the region, all had effect, and the highlands were gradually worn down. The Laurentian thus supplied the greater part of

the material which formed the great central plains of the continent.

Related Subjects. For further details, consult CANADA (Physical Characteristics of the Dominion; Plant and Animal Life; Canada's Natural Resources; Mining); LABRADOR; QUEBEC.

LAURENTIUS. See ANTIPOPE.

LAURIER, *lo'ri ay*, SIR WILFRID (1841-1919), a Canadian statesman, Premier of the Dominion from 1896 to 1911, and the first



Photo: Brown Bros.

SIR WILFRID LAURIER

French-Canadian to hold this office. His Premiership was not merely the longest, but in some respects was the most important, of the period following the organization of the Dominion. During those fifteen years, Canada passed through an era of growth and development which left a nation scarcely recognizable as the Dominion of 1867. Conspicuous was the expansion of Canadian railways, of agriculture, and manufactures. More significant was the growth of Canadian nationality within the broad field of British imperialism, a greater national consciousness allied with a stronger feeling of kinship for all other parts of the realm now known as the British Commonwealth of Nations. Of the many features of those fifteen years, the outstanding ones are the enactment of special tariffs for goods im-

ported from Great Britain, the participation of Canadian troops in the South African War, the contract for the construction of the Grand Trunk Pacific Railway, the adoption of two-cent postage for letters between Canada, Great Britain, and the United States, the organization of the provinces of Alberta and Saskatchewan, and finally, the failure of the reciprocity agreement between the United States and the Dominion. This agreement, opposed by a majority of the Canadian people, ended the Laurier Ministry's lease of power.

Laurier was born at Saint Lin, Que., on November 20, 1841. At twelve he entered L'Assomption College, and at nineteen began to study law at McGill University. At graduation he was class valedictorian, an honor which he grasped to appeal for sympathy and understanding between the French and the English in Canada. This appeal was no less characteristic of him as Premier of the Dominion than as class valedictorian. When he had power, he did as he urged others to do many years before.

For about six years after his call to the bar, in 1864, Laurier divided his time between journalism and law. He edited a newspaper of extreme French sentiment, and at the same time associated with persons who were not in favor with the Roman Catholic Church. Like all the Quebec Liberals, Laurier opposed Confederation, because it would "prove the tomb of the French race and the ruin of Lower Canada." These fears were groundless, and a few years later, Laurier himself was conspicuous in Dominion politics. After three years in the Quebec assembly, he entered the House of Commons in 1874, and in 1877 became Minister of Inland Revenue in the Mackenzie Cabinet.

In 1878 began the long period of Liberal opposition, which ended in 1896 with the elevation of Laurier to the Premiership. During the latter half of the intervening eighteen years, he was the acknowledged leader of the Liberals. The party lost the general elections of 1891, and Conservative rule followed, but in 1896 was triumphantly returned.

The settlement and exploitation of the Canadian Northwest is likely to be considered, a century hence, as the greatest achievement of this period. In 1910 Sir Wilfrid arranged a reciprocity treaty with the United States, but when the issue was submitted to the voters in 1911, the verdict was against reciprocity. The Laurier Ministry thereupon resigned, and Sir Wilfrid again became leader of the opposition. On the outbreak of the World War, he ably seconded Sir Robert Borden's appeals for loyalty and service to the empire, though he seconded Quebec in its opposition to conscription, and headed the ineffective movement against the plan.

Sir Wilfrid bore a striking facial resemblance both to Sir John A. Macdonald and to Benjamin Disraeli, Earl of Beaconsfield. Public interest in this fact was noteworthy during his first visit to England, in 1897, on the occasion of Queen Victoria's Diamond Jubilee. Laurier was a speaker of genuine eloquence, without doubt one of the greatest of Canadian orators. He was not merely a skilful party leader, but a statesman of vision, who kept the respect of his opponents as well as the loyalty of his followers. On the many occasions when he represented the Dominion—at the Imperial Conferences in London, in 1907 and 1911, at the sessions of the Joint High Commission at Washington, in 1898 and 1899, at every conference in which he took a part—his presence ensured a dignity and integrity which was as characteristic of him in private affairs as it was in public life. See CANADA (History: Laurier Ministry).

LAURIUM, MICH. See MICHIGAN (back of map).

LAUSANNE, lo zahn'. See SWITZERLAND (The Cities).

LAUSANNE, TREATY OF, a convention signed in 1923 at Lausanne, Switzerland, between the great powers of Europe and the National State of Turkey. It abrogated the Treaty of Sèvres, which the powers had imposed on the Turks in 1920.

Turkey resented the harsh terms of the Sèvres document, and under the leadership of Mustapha Kemal Pasha, initiated a military campaign to force a revision. Kemal drove the Greeks from Smyrna and marched northward, threatening to cross the neutral zone imposed at Sèvres and to fight for the return of Turkey's European territory. Realizing the general danger in such an enterprise, the powers met Turkey under conditions of a truce, and agreed upon a meeting at Lausanne to discuss changes in the treaty.

At Lausanne the new Turkey, emboldened by its successes of the preceding summer and autumn, flatly demanded a revocation of the Sèvres Treaty and a new one on terms favorable to the Turks. Their diplomacy succeeded, for the Sèvres document was discarded and the new Treaty of Lausanne gave the National State nearly everything it demanded. A summary of its terms follows:

(1) Turkey regained Eastern Thrace, and again became the bridge between the East and the West.

(2) Constantinople was awarded definitely to Turkey, no semblance of allied authority to remain.

(3) All foreign troops were to be withdrawn from Turkish soil.

(4) Peace was declared between Greece and Turkey.

(5) The patriarch of the Greek Orthodox Church was permitted to remain in Constantinople.

(6) A compulsory exchange of populations was provided for—the Greeks in Turkey to return to

Greece and the Turks in Greece to return to Turkey. This was one of the deplorable results of the negotiations; it necessitated the removal of hundreds of thousands of people whose ancestors for hundreds of years had made their homes on alien soil.

(7) Armenians in Turkey were ordered to find new homes. The Armenian problem was not solved.

(8) Turkey's size was reduced by the loss of the states of Syria, Mesopotamia, and Palestine, which were given to allied countries under mandate.

(9) Turkey was freed from judicial capitulations. Previously, foreigners tried for offenses in Turkey had been permitted to appear before judges of their own country who were resident in Turkey. Thereafter, all foreign offenders would be tried before native judges, but a consular agent from the same country as a foreign prisoner would be present during the proceedings.

(10) The Straits were to become neutral territory, open to vessels of all nations alike. This is the one strong point on which Turkey and Russia were definitely defeated. The latter country has long laid claims to the Black Sea as a great "Russian lake"; that sea now becomes an international body of water, and Soviet Russia has committed itself for all time against the Russian contention of hundreds of years.

Related Subjects. In connection with the foregoing article, the reader should consult the article SÈVRES, TREATY OF. See, also, TURKEY (History); SMYRNA; GREECE (History).

LAUT, AGNES CHRISTINA (1872-), a Canadian journalist and author, best known for her biographical and historical sketches. Miss Laut was born at Stanley, Ont., but removed to Winnipeg during her childhood. She attended the University of Manitoba for three years, until ill health compelled her to withdraw. Loss of health was not entirely a misfortune, for she spent the following summers in the Rocky and Selkirk mountains, her knowledge of which was later of untold value to her. In 1895 Miss Laut became an editorial writer on the *Manitoba Free Press*, at Winnipeg, and after 1897 was a frequent contributor to other Canadian and American newspapers and journals.

Representative Works. Her first important book, *Lords of the North*, appeared in 1900, and was followed at irregular intervals by *Heralds of Empire*; *Pathfinders of the West*; *Vikings of the Pacific*; *The Conquest of the Great Northwest*; and *Freebooters of the Wilderness*. One of her later books is entitled *Through Our Unknown Southwest, the Wonderland of the United States*.

LAVA, lah' vah, rock flowing from volcanoes in a molten state. When cooled, it forms rocks of different sorts, such as tufa, basalt, and trachyte. Lava is not simply molten rock; it contains several minerals in solution in the molten matter. When lava cools, these crystallize as they become solid; therefore rocks formed from lava are usually crystalline. If cooled rapidly, lava forms a fine-grained rock; if cooled slowly, it becomes a coarsely grained crystalline rock. We usually associate lava beds with volcanoes, but in past geologic ages,

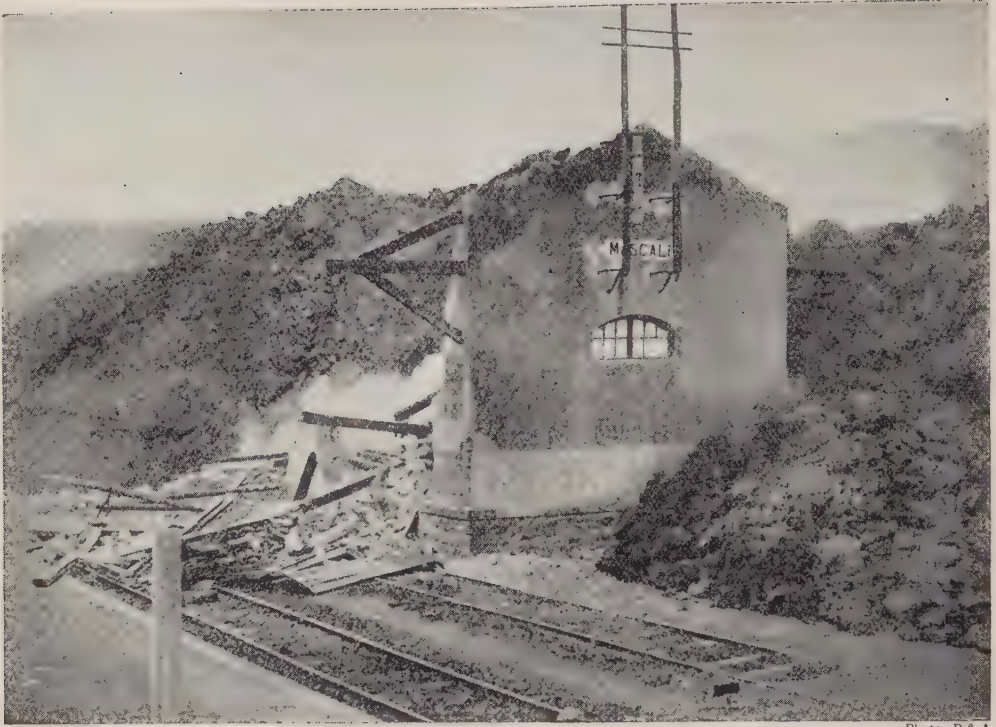


Photo: P & A

A DESTRUCTIVE FLOW OF LAVA

A striking picture showing the overwhelming force of a hot stream of lava. In a recent eruption of Mount Etna, the town of Mascali, Italy, 10,000 population, was one of several cities that were destroyed in the manner depicted above. All that remained of the railroad station is shown.

great quantities of lava were forced up between other layers of rock. In volcanic regions, lava beds are found on the sides and at the base of the volcanoes. The regions around Mount Vesuvius in Italy, Mount Etna in Sicily, and the Hawaiian Islands contain lava beds of recent formation. No lava flowed from Vesuvius, for instance, until the year 1066.

R.H.W.

Related Subjects. The reader is referred in these volumes to the following articles:

Basalt	Trachyte
Crystalline Rocks	Tufa
Etna	Vesuvius
Hawaii (The Land)	Volcano

LAVAL, *lah vah'l'*, MONSIEUR DE. See CANADA (History).

LAVAL UNIVERSITY. See QUEBEC (province), section on *Education*; QUEBEC (city), section on *Buildings, Monuments, and Parks*.

LAVENDER, a plant of the mint family, whose fragrant flowers and leaves enjoy a time-honored reputation for attractiveness of scent. Lavender is generally associated with the purity and fragrance of old-fashioned linens and clothing belonging to old-fashioned ladies of a former generation, who were accustomed to store their garments with the dried flowers and leaves. The most important modern use

of the plant is in connection with the manufacture of perfumery, in France and England especially, though it is still employed to some extent for storage and seasoning purposes. *Lavender* is from the Latin *lavo*, to *wash*; the name was given because of the ancient use of the leaves and flowers in bath waters.

The little bush, from three to four feet high, grows wild in countries about the Mediterranean Sea. It is easily cultivated from cuttings or divisions of older roots, and thrives in all temperate climates, growing best in a sandy, well-drained soil. The gray-green leaves are long and narrow. The pale-purplish blossoms, whose characteristic hue has added the word *lavender* to our vocabulary of colors, grow in whorls about a stalk. When properly dried, they retain their fragrance for a long time.

B.M.D.

Scientific Name. Lavender belongs to the family *Menthaceae* (or *Labiatae*). Its botanical name is *Lavandula vera*.

LAVATER, *lah vah' tur*, JOHANN KASPAR (1741-1801), founder of the science of physiognomy (which see).

LAVINIA. See AENEID.

LAVOISIER, *la vvah zya'*, ANTOINE LAURENT (1743-1794), a celebrated French chemist,

born in France. He was educated at the College Mazarin, where he showed particular interest in the physical sciences and mathematics. In 1766 the French Academy of Sciences awarded him a gold medal for a plan of lighting city streets, and two years later made him a member. He presented papers on a variety of subjects, which were the results of careful research, and after being given the government post of farmer-general of the revenue, he was enabled to devote the needed time to his studies and investigations. He has been called the father of modern chemistry, not for his discoveries alone, but because he aroused the science from its lethargy, and injected into it a new spirit. By experiments he was able to prove the law of the conservation of matter, which, stated in his own words, is:

Nothing can be created, and in every process there is just as much substance present before as after the process has taken place.

When a candle burns, it appears to be entirely consumed, but by preparing an apparatus which will allow a candle to burn and at the same time absorb the products of combustion, it will be found that there is as much mass or weight present after as before the candle was burned, though the substances are in different form. From these facts, Lavoisier worked out the fundamentals of chemical equations, in which the mass of materials at the beginning of a reaction must equal the mass of the products of any chemical change that takes place. Another service Lavoisier performed for the science of chemistry was to introduce a standard set of chemical terms and nomenclature. These in the main are used to-day.

He had other interests besides chemistry, and he worked to improve agricultural methods in France, and to establish agricultural experiment stations. Practical sociology and economics also interested him, and he devised methods of accounts, insurance, savings banks, and taxation, in addition to many schemes for the greater comfort and well-being of communities. When the French Revolution came, his services to France and to science were forgotten, but it was remembered that he had been a farmer-general and a man of wealth in the employ of the government. That was reason enough to consign him to the guillotine, and at the height of its creative power, this wonderful mind was destroyed.

LAW, as related to government, is a system of rules designed to bring the conduct of the individual into harmony with the recognized practice of his fellow men. It is intended to give direction to individual actions that are regarded as essential to group welfare.

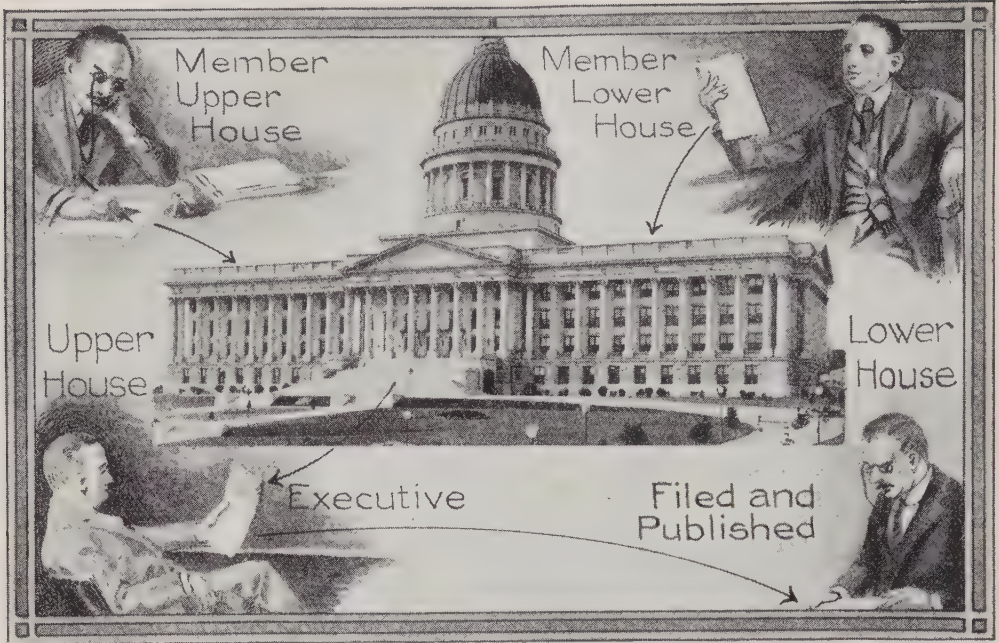
In its origin, law is only custom. The individual acts or refrains from acting in a certain way. Precedent is thus established. With the

setting up of tribunals, the process of law building is hastened. Judges find rules in interpreting popular customs and by consulting earlier decisions. Thus, out of social habits there has gradually been evolved one of the three great branches of law—the *common law*. Common law may be defined as that set of rules which the early courts developed in decisions in cases before them without the assistance of the legislature. These rules were the outgrowth and the result of the influence of religion, custom, scientific discussion, and adjudication (in many instances arbitrary). This was the origin of *law of equity*. In England, Canada, and the United States, equity is recognized as judge-made law. The third branch of law, *statutory law*, is enacted by a legislature.

All law may be grouped under two heads, technically known as *substantive* and *adjective*, or *remedial*. The former serves to define the normal relations which the individual sustains to the state and his fellows; the latter is law of procedure, dealing with methods of carrying out the remedy. Substantive law divides into *public law*, which has to do with the state and its relations, and *private law*, which concerns private persons and property. Further subdivisions of substantive law are too numerous to be treated adequately in a general survey. It will suffice to say that substantive law deals with such matters as the relation of the citizen to the state, property rights, inheritance, the family, contracts, and so on. *Constitutional law*, which is a division of public law, regulates the organization of the State and the relation of its several parts. *International law*, even in its most modern development, is almost wholly based on custom. No adequate machinery exists for coercing delinquent nations.

Remedial law, or the law which applies remedies, concerns itself with the redress of wrongs, the punishment of criminals, and the classification of crimes and penalties. In point of fact, these two main branches of the law, the remedial and the substantive, overlap, since both have for their purpose the protection of society. It is impossible to give in detail here the treatment of laws by the various peoples, but many special features of national and state laws are described in the articles on the respective nations, states, and provinces. See *Related Subjects*, at the end of this article.

United States Law Schools. There are more than a hundred of these in the United States, teaching over 20,000 students every year. Most of them are connected with universities. The first school existed at Litchfield, Conn., from 1784 to 1833, and was founded after earlier attempts to establish legal lectures at colleges had failed. Several of the best university law schools, including those of Yale,



HOW A BILL BECOMES A LAW

In either house of the English or Canadian Parliament or of the American Congress, any member may introduce a bill which he seeks to have enacted into a law. He presents this bill in the house of which he is a member; it is referred to a committee, which discusses its merits, and eventually may report it favorably for passage. If it passes the house in which it was introduced, it goes to the other house, where it must be voted upon. In case it passes this second vote, it then is sent to the executive authority, the President or Governor-General, or king, for approval. If he signs it, it becomes a law and is forwarded to the Secretary of State or corresponding official, to be published. If the bill fails to pass either house, or if the executive will not sign it, it cannot become a law unless passed over the veto.

Pennsylvania, Michigan, and Northwestern universities, were established between 1830 and 1860. The *case system* of instruction, in which individual analysis of legal decisions supplants the study of textbooks, was established at Harvard in 1870, and is now employed by most of the leading schools. Some law schools, and the number is increasing, admit only holders of college degrees, and several others require students to have completed from one to three years of college study.

Canada Law Schools. In Canada there is a faculty of law at each large university. Roman and civil law are given greater emphasis than in the United States. In both countries the course of study is usually three years, for which the degree of Bachelor of Laws (LL.B.) is given. Laval University follows the French system, giving also the degree of Licentiate.

What Sort of Boy Should Study Law. In the days when education was a treasure possessed by comparatively few, almost every young man who could read or write was encouraged to enter the ministry or the profession of law. To-day this would seem absurd, yet those people make just as radical an error

who believe that all boys who are good speakers should become lawyers, and all with a well-developed moral sense, ministers. The practice of law requires much more than the ability to speak in public. There is perhaps no occupation so trying on the morals and on integrity as the legal profession. Laws are attempts to introduce justice into the relationships of men; that they are constantly being changed is evidence that they are not perfect. Yet, unless he watches himself very closely, a lawyer will find himself testing proposed actions by the question, "Is it legal or illegal?" instead of "Is it right or wrong?" Thus, even among men who consider themselves honest, the law often becomes a cloak for moral dishonesty, rather than a protection against illegality.

A successful lawyer must possess what is known as the legal mind; the ideal lawyer has the ability to see both sides of a case. It is obvious that at least one side in a dispute is wrong, and this is often true of both sides. Therefore many cases offered to lawyers are unjust or extravagant claims. A judicially minded lawyer will anticipate the judge's decision in most of them, and advise his client

to abandon or moderate his demands. He thus avoids losing his case in court, and saves his client needless expense.

A boy should not decide upon a legal career because it is a "gentleman's profession" and because it appears to involve no hard work. There are no longer any "gentleman's professions." To-day every honest toiler may be a dignified member of his community; the most humble worker who is honest and clean is morally above the boy who feels that he must be a "gentleman." As to the law's ease, let it be recorded that small income, hardship, and discouragement are more often the rule for the early years than in most other professions. The young man who turns to the law should be of a deeply studious turn of mind, a clear thinker, and a hard worker; and unless he wishes to take up a specialized form of practice, he must be able to develop good speaking power—the fire that persuades juries. Added to the above, if he is fervent in his love of justice toward all men, he may feel that truly he is "called" to the bar. E.D.F.

Related Subjects. The following articles in these volumes treat of some of the various phases of law:

Abandonment	Contract
Abatement	Convict Labor
Abstract	Copyright
Accessory	Corporation
Accident Prevention	Courts
Administrator	Crime
Adoption	Criminology
Adulteration of Food-stuffs and Clothing	Deed
Affidavit	Demurrer
Age	Easement
Agent	Electrocution
Alias	Eminent Domain
Alibi	Employers' Liability
Alien	Enabling Act
Alimony	Enemy
Anti-Trust Laws	Equity
Appeal	Estate
Arrest	Evidence
Assignment	Executive
Attachment	Executor
Attainder	Exile
Bail	Expectation
Bar Association, American	Ex Post Facto
Bankrupt	Extradition
Barrister	False Imprisonment
Barter	Finger-Print Identification
Benefit of Clergy	Fief
Bertillon System	Franchise
Bill of Rights	Garnishment
"Blue Sky" Laws	Garrote
Bona Fide	Guarantee
Boycott	Guillotine
By-Law	Habeas Corpus
Capital Punishment	Hanging
Chancery, Court of	Heir
Chattel	High Seas
Civil Death	Homestead Laws
Civil Law	Husband and Wife
Claims, Court of	Idiot
Code Napoleon	Indeterminate Sentence
Commercial Law	Indictment
Common Carrier	Injunction
Common Law	Inquest
Conspiracy	Insanity
Contempt	International Law
	Intestacy

Joint-Tenancy	Pillory
Judge	Power of Attorney
Judgment	Primogeniture
Jury and Trial by Jury	Prison
Juvenile Court	Probate
Labor Legislation	Proxy
Lease	Public Defender
Legacy	Pure Food Laws
Libel	Quorum
License	Rack
Lien	Real Estate
Lynch Law	Receiver
Malice	Reform Schools
Mandamus	Replevin
Martial Law	Retainer
Morals Court	Riparian Rights
Mortgage	Search, Right of
Negligence	Statute
Neutrality	Subpoena
Notary Public	Sumptuary Laws
Nuisance	Supreme Court
Oath	Tenant
Pardon	Title
Parent and Child	Torrens System
Parliamentary Law	Tort
Parole	Torture
Partnership	Trespass
Patent	Trustee
Peace, Breach of the	Usury
Peer and the Peerage	Wager
Perjury	Warrant
Personal Liberty	Will
Personal Property	Witness
Petition	Writ

The following jurists and lawyers are given separate treatment in these volumes:

Allen, Florence E.	Ingersoll, Robert Green
Alverstone, Lord	Jay, John
Blackstone, Sir William	Jeffreys, Lord
Brandeis, Louis	Kent, James
Chase, Salmon P.	Landis, Kenesaw M.
Choate (family)	Lindsey, Benjamin Barr
Davis, David	Lockwood, Belva A.
Field, David Dudley	Marshall, John
Field, Stephen Johnson	Moore, John B.
Fuller, Melville Weston	Root, Elihu
Gray, George	Story, Joseph
Grotius	Taft, William H.
Harlan, John	Taney, Roger Brooke
Hoar, George F.	Waite, Morrison Remick
Holmes, Oliver Wendell, Jr.	Watson, Thomas E.
Hughes, Charles Evans	Wharton, Francis
	White, Edward Douglass

LAW, ANDREW BONAR (1858-1923), a British statesman, born, however, in New Brunswick. When he was twelve years of age, his parents removed to Glasgow, Scotland. At the age of sixteen, he was given a position in the iron works of which his uncle was the head, and he learned the business thoroughly, becoming a successful iron manufacturer. In 1900 he was elected to the House of Commons for Glasgow as a Unionist, and in 1902 he became Parliamentary Secretary of the Board of Trade, holding the position until 1906. In 1911 he succeeded Arthur J. Balfour as leader of the Opposition, and in the reorganized Cabinet of Asquith, in 1915, he was given the portfolio of Secretary of State for the Colonies. Before David Lloyd George succeeded Asquith as Premier, in 1917, Law was asked to assume that post, but he declined. He became Premier in October, 1922, on the downfall of the



"DON'T GIVE UP THE SHIP!"

[From a contemporary painting.]

Lloyd George Coalition Ministry, and served to May, 1923, when illness forced his resignation.

LAW, JOHN (1671-1729), a financier and speculator who became famous as the originator of a scheme to develop the resources of the province of Louisiana and the region bordering on the Mississippi, which was believed to be rich in precious metals (see **MISSISSIPPI SCHEME**). He was born at Edinburgh, the son of a goldsmith and banker. Law displayed a remarkable aptitude for mathematics and kindred sciences when he was very young. He spent a great deal of time in Amsterdam, studying the credit operations of the bank, and about the year 1700 returned to Edinburgh. At this time he proposed to the Scottish Parliament that a paper currency be adopted, but his proposition, after a great deal of debate, was rejected.

Having made a fortune by gambling, he opened a bank in Paris. The Duke of Orleans became his patron, and in 1718 he adopted Law's plan for a national bank. In 1717 Law had originated his famous Mississippi Scheme; three years later, on the failure of the project and the collapse of the bank, he fled from France. Settling finally in Venice, he managed to make a poor living by gambling.

LAW, JULIETTE, founder of the Girl Guides, which became the Girl Scouts (which see).

LAWN, a fine linen or cotton fabric. See **BLEACHING**.

LAWN BOWLING. See **BOWLING**, subhead.

LAWN TENNIS. See **TENNIS**.

LAWRENCE, JAMES (1781-1813), an American naval officer, whose dying command, "Don't give up the ship," has become a watchword in the American navy. Lawrence was born in Burlington, N. J. He was the son of a judge, and began the study of law under his brother at Woodbury, N. J. Subsequently, he took a course in the principles of navigation and naval tactics, and joined the United States navy as midshipman in 1798.

He served on the *Ganges* in the West Indies and was made acting lieutenant in 1800, receiving a lieutenant's commission in 1802. Lawrence distinguished himself in the war with Tripoli in 1804-1805 (see **BARBARY STATES**), being one of the picked crew chosen by Captain Decatur to set fire to the *Philadelphia*. He served as lieutenant on the *Constitution* in 1808, and had under his command at different times the *Argus*, *Wasp*, and *Vixen*, vessels noted in early American history.

In 1811 Lawrence was commissioned captain and assigned to the *Hornet*, joining the squad-

ron under Commodore Bainbridge off the coast of Brazil. He captured the English ship *Resolution*; later, in an engagement with the English brig *Peacock*, the latter surrendered, the Americans losing only one man killed and two wounded. Lawrence received for this exploit a vote of thanks from Congress and a gold medal.

He was then given command of the *Constitution*, but was shortly afterward transferred to the *Chesapeake*, a vessel with an indifferently trained crew and an unlucky reputation. Just after assuming command, Lawrence was challenged by the English vessel *Shannon*, June 1, 1813. While fighting bravely against sure defeat, he was desperately wounded, but insisted on remaining on deck for a time before being carried below. His words uttered at this time, when he knew the situation to be hopeless—"Don't give up the ship"—were engraved on the quarterdeck of the *Chesapeake*, and on a monument erected in Trinity Churchyard, New York. He died June 6, at the age of thirty-two, in Halifax, the port to which the captured *Chesapeake* had been taken. His body was returned to the United States government.

LAWRENCE, KAN. See KANSAS (back of map).

LAWRENCE, MASS., the county seat of Essex County, is the principal center in the United States for the manufacture of worsted cloth. The city is built along both sides of the Merrimack River, and is located in the north-eastern part of the state, twenty-six miles northwest of Boston and ten miles northeast of Lowell. Population, 93,000.

Transportation. Lawrence is served by the main division of the Boston & Maine Railroad, and has motorbus and electric lines radiating to the near-by cities of Lowell, Haverhill, and Salem, Mass., and to Salem, N. H.

Industry. The site of the present city was acquired, about 1845, because of the available power in the Merrimack River. An immense dam was built, and a thriving manufacturing city was soon in process of development. It was planned to make the place a textile center, but the early supremacy of cotton manufacture soon gave way to the leadership of woollens, especially worsted cloth for men's and women's suitings. To-day the place is the home of the American Woolen Company, the Pacific Mills, the Arlington Mills, and other large worsted-cloth plants. The manufacturing and printing of cotton cloth and the making of silk fabrics are also important. Other manufactured products include shoes and accessories, pulp-mill and paper machinery, paper, and numerous machine specialties. J. J. M'K.

LAWRENCE, SAINT. See ESCORIAL.

LAWRENCE, THE, flagship of Oliver H. Perry (which see).

LAWTON, HENRY WARE (1843-1899), an American military hero, who, after serving in several wars, gave his life for his country in

the Philippine Islands. He was born in Manhattan, O. In 1861, on the outbreak of the War of Secession, he became a volunteer in the Union army, and at its close was mustered out a brevet colonel of volunteers. In 1866 he entered the regular army as second lieutenant, served with conspicuous bravery against the Sioux and Ute Indians, and captured the Indian chief, Geronimo (which see), in 1886. Lawton commanded a division of volunteers in the Spanish-American War at Santiago, and fought with distinction in the attack on El Caney, July 1, 1898. He was then ordered to the Philippines as second in command to General Otis, and there rendered conspicuous service, fighting more than twenty battles. During the Battle of San Mateo, while riding on a white horse at the head of his troops, General Lawton fell, mortally wounded.

LAWYER. See LAW.

LAZARUS, the brother of Mary and Martha of Bethany, the youngest member of the family that Jesus loved (*John* XI, 1-44). According to the Biblical record, at Jesus' call, "Lazarus, come forth," he rose and came out of the tomb after having been dead four days. Tennyson, in his *In Memoriam*, has this stanza concerning Lazarus of Bethany:

Where wert thou, brother, those four days?
There lives no echo of reply,
Which, telling what it is to die,
Had surely added praise to praise.

Lazarus is also the name of the beggar in the parable of the Rich Man and Lazarus (*Luke* XVI, 19-31). This is the only instance in which a proper name is given to a character in a Gospel parable.

LAZURITE. See LAPIS LAZULI.

LEA, lee, FANNY HEASLIP (1884-), an American writer of fiction, born in New Orleans and educated at Tulane University. In 1911 she was married to Hamilton Pope Agee, but divorced him in 1926. Miss Lea's stories have a charming romantic quality that gives her a wide audience among women readers. Many of her works have a background of Hawaiian life and scenery, inspired by her long residence in the islands.

Representative Works. These include *Quick-sands*, *The Jacometta Stories*, *Sicily Ann*, and *Chloe Malone*. Miss Lea is widely known for her short stories in magazines; most of her novels were published serially.

LEACOCK, STEPHEN BUTLER (1869-), popularly regarded as the leading humorist of Canada, is favorably known in the United States, where his syndicated newspaper articles have been widely read. He was born in England, at Swanmoor, Hants, but went to Canada as a boy, and was educated at Upper Canada College and at the University of

Toronto; he also took a postgraduate course in political science at the University of Chicago, from which he received the degree of Doctor of Philosophy. Since 1891 Dr. Leacock has been a teacher, and for many years has been head of the department of economics and political science in McGill University.

His Books. Among his most important works are *Literary Lapses*; *Sunshine Sketches of a Little Town*; *Nonsense Novels*; *Behind the Beyond*; and *Arcadian Adventures with the Idle Rich*. Of his more serious literary efforts the best-known is *Elements of Political Science*.

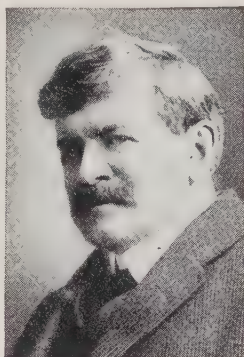


Photo: Brown Bros.

STEPHEN LEACOCK

LEAD, *led*, a soft metal, used principally in the manufacture of lead pipe and white lead, an important paint pigment. Lead is of a bluish-gray color and so soft that it can be scratched with the finger nail. It is eleven and one-third times heavier than water; from this fact we can readily understand how the expression "heavy as lead" originated. It is well to remember, however, that many substances are heavier than lead. When cut, lead presents a bright, metallic surface, almost as white as silver, but it soon turns dull because of the combination of oxygen of the air with it. It melts at a temperature of about 620° F., which is above the melting point of tin but below that of zinc. When it cools, however, it contracts, and cannot be used for making castings or anything requiring careful measure-

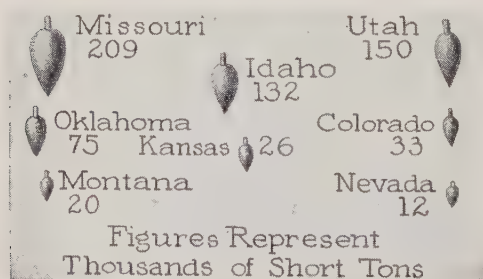
broken into small fragments. Its chief source of supply is the ore galena, which is a compound of lead and sulphur. It occurs in cube-like crystals with a gray metallic luster. Another ore, a compound of lead and carbonic acid, contains silver and copper, and all three metals have to be considered in treating this ore. Lead is obtained from galena by roasting the ore with iron, when the sulphur combines with the iron and sets the lead free.

Uses. While its chief use is in the manufacture of lead pipes, lead is also employed for lining tanks and tea chests and in making numerous alloys, such as solder, which is lead and tin; shot and type metal, composed of lead and antimony; and pewter, a combination of lead and zinc. The enamel used in bath tubs contains lead. A number of compounds of lead are important in the arts. Lead acetate, or sugar of lead, is used in dyeing; carbonate of lead, or white lead, is the basis of the best paints; red lead, a compound of lead and oxygen, is also used as a paint;



WORLD PRODUCTION OF LEAD

The countries which lead in lead mining. The statistics apply to production based on the average per year for a five-year period.



PRINCIPAL UNITED STATES SOURCES

Figures represent average production over a period of five years.

ments. Lead is a metallic element, and its symbol is *Pb* (from *plumbum*, the Latin name for the metal).

Occurrence. Lead is found in many localities, in veins and also in masses. The process of mining is simple, since the ore is readily separated from the enclosing rock when

litharge, another oxide of lead, is used in making plate glass and glass for lenses. Lead chromate is used as a pigment under the name of *chrome yellow*. It is of interest to note that although white lead and red lead are lead compounds, black lead is not lead at all, but a form of carbon. The "lead" in pencils is graphite.

Production. The United States produces more lead than any other country. Missouri is first, Utah second, in production; other important states, varying in rank, are Idaho, Oklahoma, Montana, and Colorado. Among the other countries which produce lead in quantities important to commerce are Spain, Mexico, Germany, Burma, Belgium, and Italy. In Canada practically all of the output comes from British Columbia.

T.B.J.

Related Subjects. The reader is referred in these volumes to the following articles:

Alloy

Galena

Lead Poisoning
Metallurgy
Paint

Pewter
Radioactivity
White Lead

LEAD, SOUNDING, an instrument upon which sailors once depended for determining the depth of water. It is a tapered leaden cylinder attached to a lead line of rope or wire. Since shores and harbors have been charted, and instruments have been invented which will accurately measure depths from ships in motion, the lead is seldom employed in navigation, though still used in explorations of shallow waters (see SOUNDING). The under side of a lead is hollow and contains tallow, that it may bring up ooze or mud to prove that it has touched the sea bottom. The hand lead, for use in less than twenty fathoms (120 feet) of water, weighs from five to fourteen pounds.

LEAD, *lead*, S. D. See SOUTH DAKOTA (back of map).

LEAD GLANCE. See GALENA.

LEAD, KINDLY LIGHT (hymn). See HYMNS AND HYMN TUNES; NEWMAN, JOHN HENRY.

LEAD PENCIL. See GRAPHITE; PENCIL; LEAD.

LEAD POISONING. This ailment occurs in acute and chronic forms, but acute lead poisoning is rare. Its symptoms are colicky pains and, in very severe cases, convulsions. Lead is present in the urine.

Chronic poisoning, with periodic acute attacks, is fairly common among those who are exposed to lead during their work, or who drink water or eat foods containing it. The lead is absorbed principally through the digestive tract, and partly through the breathing apparatus. While it is circulating in the blood, it causes the characteristic symptoms, but gives rise to few while deposited in the bones, gums, and other tissues. It may be periodically absorbed from the bones, causing the symptoms at such times. The lead is excreted principally by the kidneys. The chief symptoms of lead poisoning are lead colic, the lead line in the gums, anaemia, changes in the red blood cells, pallor, constipation, indigestion,

and wrist drop or other forms of paralysis. Some persons acquire lead poisoning from drinking carbonated water; some from chewing tobacco or dipping snuff; some from eating foods colored with or containing lead; some from absorbing lead in wall paper. Most lead poisoning, however, results from exposure to lead by those at work. To avoid this poisoning when working with or near lead, chew no tobacco, smoke no cigars or cigarettes, and avoid eating lunch in the work room. The

hands should be washed before meals, and the body, the work benches, and the room itself should be kept clean. It is desirable to drink plenty of milk. W.A.E.

LEAF CURL. See PEACH (Enemies).

LEAF INSECT, an East Indian insect, remarkable for its resemblance to a green leaf, and for this reason sometimes called *walking leaf*. It is bright green in color, and measures about three inches in length. Its foliage-like appearance is due both to the broad,

ribbed wings and to the leaflike expansions at the joints of the legs. Even the eggs bear a curious similarity to the seeds of plants. Leaf insects are found under wood or shrubs, where, on account of their form and color, they are not readily discovered. They feed upon leaves at night, and are usually quiet during the day. W.J.S.

Classification. The leaf insect described belongs to a large family, *Phasmidae*, represented in the United States by the walking sticks (which see). These insects are all members of the order *Orthoptera* (which see).

LEAF ROLLERS. See MOTH (Moth Families).

LEAGUE, *leeg*, a measure of length, of ancient origin. The Romans, who derived it from the Gauls, computed it as equivalent to 1,500 Roman paces, or 1.376 modern English miles. The league was introduced into England by the Normans, probably in 1066, and it then equaled two English miles of the period, or 2.9 modern English miles. At the present



LEAF INSECTS

At left, a wingless variety; at right, a winged insect.



Photo: Gilliams Service

A TRIBUTE TO WOODROW WILSON

There has been placed on the wall of the terrace of the League of Nations palace at Geneva the handsome plaque pictured above, "To the memory of Woodrow Wilson, President of the United States, founder of the League of Nations."

time, in England and America, it is a marine measure, equivalent to three geographical miles, or 3.456 statute miles. See MILE.

LEAGUE OF NATIONS, a world-wide union of great and small countries, designed as an international force which should guarantee justice to all peoples and make future wars impossible. It was made the foundation on which the Treaty of Versailles was built in 1919, terminating the World War. To say that every part of the peace treaty was dependent on the League is to state a fact; at the Peace Conference at Versailles, the proposed League and the treaty of peace were so interlocked that the two were inseparable. To quote a leading member of the Conference, "They could not be unscrambled." The masters of the situation in the Peace Conference determined that not only would a moral and legal union of powers be necessary to guarantee the proper enforcement of the multitudinous decrees of the treaty, but that when new countries in Central Europe were to be organized on the basis of "self-determination of peoples," such a union would be necessary to help maintain them against angry and jealous neighbors; moreover, it was deemed necessary to provide a world clearing house

for the settlement of grievances which, in all past times, had been the forerunners of war.

President Wilson, Sponsor. The first suggestion regarding such a union was presented by President Wilson of the United States, early in 1918, as one of "Fourteen Points" which ought to be considered in bringing the war to a close. While the President's plan was little understood at the time, it was respectfully accepted for consideration by all the governments concerned. With characteristic persistency, Wilson insisted that the League should be made a part of the treaty; had he been less determined, the statesmen of Europe would doubtless have rejected it.

The first draft of the treaty of peace contained features relating to the League which were objectionable to European leaders, and amendments were made. As finally approved by all the signatory powers, including Germany, which signed by compulsion, the Covenant contains twenty-six articles. They deal with the League's organization; provide for membership and withdrawal of nations; set forth conditions of arbitration of national disputes; outline procedure in the matter of subjects submitted to the League for decision; provide headquarters (at Geneva, Switzerland);



Photos: Wide World; Keystone

A Session of the Assembly of the League. The inset shows the headquarters of the League at Geneva.

3005

and set up the plans for a staff of people to carry on its work.

Personnel. The following statement summarizes the organization of the League:

The Assembly. This body consists of representatives chosen by each country which holds membership in the League. No country can have more than three representatives; regardless of the number, each nation has but one vote on any question. The Assembly meets annually.

Executive Council. This is a small body, chosen from the members of the Assembly. The original intention was that it should comprise one member each from the United States, Great Britain, France, Italy, and Japan, and one from each of four countries to be named by the Assembly. The refusal of the United States to ratify the Treaty of Versailles nullified the provision that it should have a place on the Council.

Secretariat. The Executive Council names the permanent general secretary of the League, and this official, with his staff of assistants and employees, is recognized as the Secretariat. The salary of the permanent secretary is \$25,000 per year.

Membership. Nations originally became members of the League by signing, through their foreign offices, the Covenant of the League. New members are admitted, upon application, by consent of two-thirds of the Assembly. If a nation desires to withdraw from membership, it must give two years' notice of such intention.

The following nations are members of the League; the dates denote the time of joining:

Abyssinia.....	September 28, 1923
Albania.....	December 16, 1920
Argentine Republic.....	July 18, 1919
Australia.....	January 10, 1920
Austria.....	December 16, 1920
Belgium.....	January 10, 1920
Bolivia.....	January 10, 1920
Bulgaria.....	December 16, 1920
Canada.....	January 10, 1920
Chile.....	November 4, 1919
China.....	July 16, 1920
Colombia.....	February 16, 1920
Cuba.....	March 8, 1920
Czechoslovakia.....	January 10, 1920
Denmark.....	March 8, 1920
Estonia.....	September 22, 1921
Finland.....	December 16, 1920
France.....	January 10, 1920
Germany.....	September 8, 1926
Greece.....	March 30, 1920
Guatemala.....	January 10, 1920
Haiti.....	June 30, 1920
Holland.....	March 9, 1920
Honduras.....	November 3, 1920
Hungary.....	September 18, 1922
India.....	January 10, 1920
Irish Free State.....	September 10, 1923
Italy.....	January 10, 1920
Japan.....	January 10, 1920
Latvia.....	September 22, 1921
Liberia.....	June 30, 1920
Lithuania.....	September 22, 1921
Luxemburg.....	December 16, 1920
New Zealand.....	January 10, 1920
Nicaragua.....	November 3, 1920
Norway.....	March 5, 1920

Panama.....	January 9, 1920
Paraguay.....	December 26, 1919
Persia.....	November 21, 1919
Peru.....	January 10, 1920
Poland.....	January 10, 1920
Portugal.....	April 8, 1920
Rumania.....	April 8, 1920
Santo Domingo.....	September 29, 1924
San Salvador.....	March 10, 1924
Serb-Croat-Slovene State.....	February 10, 1920
Siam.....	January 10, 1920
South Africa.....	January 10, 1920
Spain.....	January 10, 1920
Sweden.....	March 9, 1920
Switzerland.....	March 8, 1920
United Kingdom.....	January 10, 1920
Uruguay.....	January 10, 1920
Venezuela.....	March 3, 1920

LEAGUE OF WOMEN VOTERS, NATIONAL. See NATIONAL LEAGUE OF WOMEN VOTERS.

LEAH. See JACOB.

LEANDER. See DARDANELLES (In Myth and Story); HELLESPONT; HERO.

LEANING TOWER OF PISA, *pe' sah*. See PISA, LEANING TOWER OF.

LEAP YEAR, a year which has 366 days, or one day more than an ordinary year. The extra day is added to the month of February. The origin of the name is unknown, but it probably arose from the fact that any date in a leap year after the added day of February 29 "leaps" over the day of the week on which it would fall in ordinary years. For example: if March 1 falls on Monday in one year, it will fall on Tuesday in the next, if that is an ordinary year of 365 days, but will fall on Wednesday if it is leap year. Leap years are those which may be exactly divided by four, except that years ending with two ciphers are leap years only when they are divisible by 400. For the scientific reason for leap year, see CALENDAR; YEAR.

LEAR, KING. See SHAKESPEARE, WILLIAM (Synopsis of the Plays).

LEASE, *leese*, a contract or conveyance for the possession and profits of land or other property for a stated period. The party granting the lease is called the *lessor*; the party to whom it is granted is the *lessee*, or *tenant*; the fixed compensation received in return for the use, possession, and profit of the property is called the *rent*. A lease for life terminates with the death of the lessee, while a lease for a term of years begins and ends at a certain specified date. Under a lease for a long period, the tenant possesses greater privileges, as he becomes the virtual owner of the premises and is limited only by rules that govern the relations of landlord and tenant. Rents may be payable in valuables other than money, such as produce, but this is unusual; indeed, the terms of a lease frequently specify that the rental shall be payable in gold, to guard against possibility of having to accept a depreciated

currency, which would lower the income derived from the property. The essential specifications in a written lease are dates, names, rent, and description of property. A lease for a period of less than a year may be by verbal contract, but it must be in writing if for a longer period. See CONTRACT; TENANT.

LEAST COMMON MULTIPLE, the least number that is exactly divisible by each of two or more numbers.

What number of pennies can be divided exactly into groups of two pennies each or groups of three pennies each? We can divide 6, 12, 18, 24, and so on into groups of 2's or groups of 3's, as three twos, two threes (see Fig. 1).

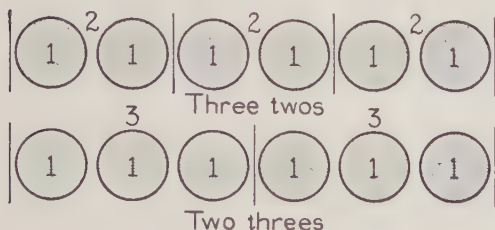


FIG. 1

By a drawing show how 12 units and 18 units can be divided into groups.

What number of yards of ribbon can be divided exactly into 2-yard strips or 5-yard strips (see Fig. 2)? Into strips of 10 yards, 20 yards, 30 yards, and so on?

Show the same for 20, 30, and 40, by drawings.

6, 12, 18, etc., are multiples of 3 and 2. 10, 20, 30, etc., are multiples of 2 and 5.

Because these numbers are multiples of two numbers, they are called *common multiples*

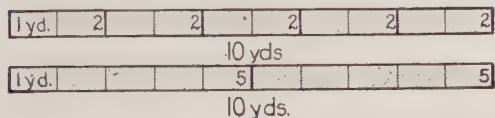


FIG. 2

of the two numbers. Since 6 is the smallest number that is a multiple of 2 and 3, and 10 is the smallest number that is a multiple of 2 and 5, 6 is called the *least common multiple* of 2 and 3, and 10 is called the *least common multiple* of 2 and 5. This term is abbreviated L. C. M.

How to Find a Least Common Multiple.

- The L. C. M. of several numbers often may be easily seen, as, of 2, 4, 8; 2, 5, 20; 5, 10, 30: 8 is the L. C. M. of 2, 4, 8; 20 is the L. C. M. of 2, 5, 20; 30 is the L. C. M. of 5, 10, 30.
- The L. C. M. is often readily found, as below, by seeing at once the greatest common factor of several numbers.

- Find the L. C. M. of 15 and 24.

$$\begin{aligned} 15 &= 5 \times 3 \\ 24 &= 8 \times 3 \end{aligned}$$

The L. C. M. = $8 \times 5 \times 3$; that is, 8×15 or 5×24 .

- Find the L. C. M. of 72 and 64.

$$\begin{aligned} 72 &= 9 \times 8 \\ 64 &= 8 \times 8 \end{aligned}$$

The L. C. M. = $8 \times 9 \times 8$.

- Find the L. C. M. of 77 and 99.

$$\begin{aligned} 77 &= 7 \times 11 \\ 99 &= 9 \times 11 \end{aligned}$$

The L. C. M. = $9 \times 7 \times 11$.

- Find the L. C. M. of 72 and 96.

$$\begin{aligned} 72 &= 3 \times 24 \\ 96 &= 4 \times 24 \end{aligned}$$

The L. C. M. = $4 \times 3 \times 24$.

- The L. C. M. is found by factoring into prime factors.

- Find the L. C. M. of 78, 91, 104.

$$\begin{aligned} 78 &= 2 \times 3 \times 13 \\ 91 &= 7 \times 13 \\ 104 &= 2 \times 2 \times 2 \times 13 \end{aligned}$$

The L. C. M. = $2 \times 2 \times 2 \times 7 \times 3 \times 13$.

Note that the "2" in 78 is not used in the L. C. M. because 2 occurs as a factor in 104, which is found in $2 \times 2 \times 2 \times 13$. The factor "7" of 91 must be used and "3" of 78 so that the multiple will contain 7×13 and 3×13 . Look for the factors of 78 in the L. C. M. above. You find $2 \times 3 \times 13$. Look for the factors of 91. You find 7×13 . Look for the factors of 104. You find $2 \times 2 \times 2 \times 13$. Having found the L. C. M. of any set of numbers, always find in it the factors of each number.

- Find the L. C. M. of 300, 252, and 540.

$$\begin{aligned} 300 &= 2 \times 2 \times 3 \times 5 \times 5 \\ 252 &= 2 \times 2 \times 3 \times 3 \times 7 \\ 540 &= 2 \times 2 \times 3 \times 3 \times 3 \times 5 \end{aligned}$$

The L. C. M. = $2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 7 \times 5$.

Note that the first six factors are the factors of 540; the factor "7" is the only factor of 252 not in 540, and it must be used so that the L. C. M. will be divisible by 252; a second 5 is the only factor of 300 not in 540 or in 252, and it must be used so that the L. C. M. will be divisible by 300.

Every prime factor of each number must be found in the L. C. M. the greatest number of times it occurs in any of the numbers. Put into its usual form, the rule is stated:

The L. C. M. of several numbers is the product of the different prime factors of the numbers, each factor being used the greatest number of times it occurs in any one of the numbers. This is seen in the last problem above: 3 is a factor of 540 three times; 2 is a factor of each of the numbers twice; 5 is a factor of 300 twice. Therefore 3 occurs as a factor in the L. C. M. three times, 2 occurs two times, and 5 occurs two times.

This factoring is sometimes done as follows:
Find the L. C. M. of 16, 54, 72.



Photo: U & U

A NATIVE MOROCCAN DYE WORKS

A photographic view of the process of tanning leather in that North African country. Primitive methods and crude utensils are still utilized in producing the so-called "Morocco" leather.

2	16	54	72
2	8	27	36
2	4	27	18
3	2	27	9
3	2	9	3
	2	3	1

The L. C. M. = $2 \times 2 \times 2 \times 3 \times 3 \times 2 \times 3 \times 1$.

Explanation. Find any prime factor common to two or more of the numbers; divide by this factor the numbers *divisible* by it, placing quotients in the line below, and with them the undivided numbers. Find a second prime factor, and divide and bring down as before. Continue as above until there is no factor common to any two of the resulting numbers. The L. C. M. is the product of all the divisors, quotients, and undivided numbers.

J.W.Y.

LEATHER is in a class with textiles and paper, because nothing takes its place. Savage man discovered that the pelts of animals could be preserved and made into foot coverings and apparel. Egyptians made leather that was considered as valuable as precious stones—made it so well that specimens 3,300 years old are brought to light in a perfect state of preservation. Babylonians, too, made leather, and we are indebted to the Hebrews for the discovery of a tanning process that, in

perfected form, is now in wide use throughout the world. In addition to using leather much as we do at present, early peoples used it for many other purposes, such as ship coverings, carpets, shields, and helmets.

To-day, leather is chiefly important for its use in footwear; about eighty per cent of the total production of the United States is used by the shoe trade. But for uses that take a lower volume, leather is exceedingly important. Industrial belting for power transmission, harness and saddles, gloves, apparel, luggage, and upholstery—all are made best when made of leather. Lesser uses where leather plays a vital part are for making meter bellows to measure gas, piano actions, industrial specialties such as packings and gaskets, and bookbindings.

American Indians made soft leather from deerskin by a process that may have been used in principle by many other primitive peoples. Skins were piled in packs to heat and decompose the hair, and the flesh was scraped off by hand. Dressing itself consisted of pounding oils and the brains of animals into the skin, and smoking completed the process. The leather thus made was soft and remarkably good.



Photo: American Leather Producers

"PATENT" LEATHER

Sunning patent leather completes the drying of its glossy finish.

Almost all hides and skins can be tanned, and a surprising variety is tanned constantly. Cattle hides are by far the most important raw material for tanners, but skins of calves, sheep, and goats are tanned by tens of millions; the world never supplies too many. Reptile skins—snake, alligator, lizard—provide a type of leather to which one branch of the industry is devoted. Shark skins are tanned, and so are those of the ostrich. Even such a list is not complete, for the entire world is combed diligently and constantly for pelts from which good leather can be made. The overcoats of the inhabitants of a veritable Noah's Ark are preserved through the tanner's art for the service of man.

Processes. Modern tanning is done mainly by either the vegetable process or the chrome process. Vegetable tannage involves the use of extracts made from natural growths—bark, wood, fruit, or nut—that contain an astringent agent called *tannin*, which actually combines with the hide substance to convert it to a different compound, namely, leather. To make sole leather by this process takes four to six months.

The chrome process, discovered by an American named Augustus Schultz, was first used, about 1890, for tanning kid leather. This involves the use of salts of the metal chromium, coating each fiber with a casing that preserves it indefinitely. It is much faster than the vegetable process, and is used mainly for

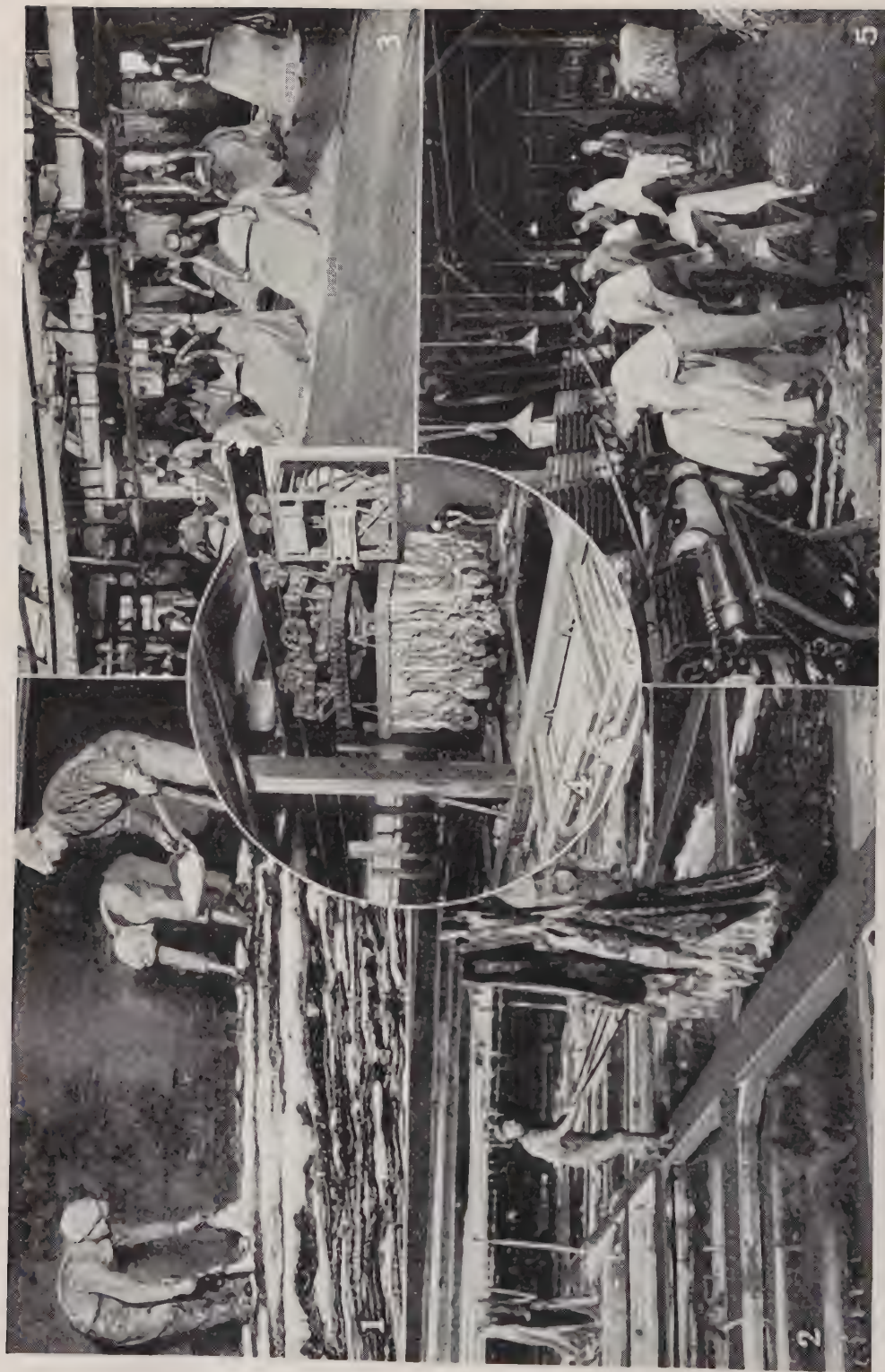
tanning lighter leathers, such as those intended for shoe uppers. About half of the leather tanned in the United States now goes through the chrome process, including some sole leather.

Small quantities of leather are oil-tanned, and others are tanned with formaldehyde. In the former group is chamois, made from sheepskin; to the latter belongs "doeskin," a white glove leather also made from sheepskin. Another relatively unimportant process uses alum as the tanning agent.

For preservation between the time of take-off and tanning, hides and skins are either salted or dried. In preparing these for tanning, it is necessary first to remove salt and dirt; next to remove hair; finally, bits of flesh adhering to the pelts. Hair is loosened by immersion in lime solutions and rubbed off mechanically. Flesh is scraped off mechanically. Sometimes further chemical treatment of the stock is desirable, as for the purpose of swelling the gelatinous tissue for better penetration of the tanning liquors.

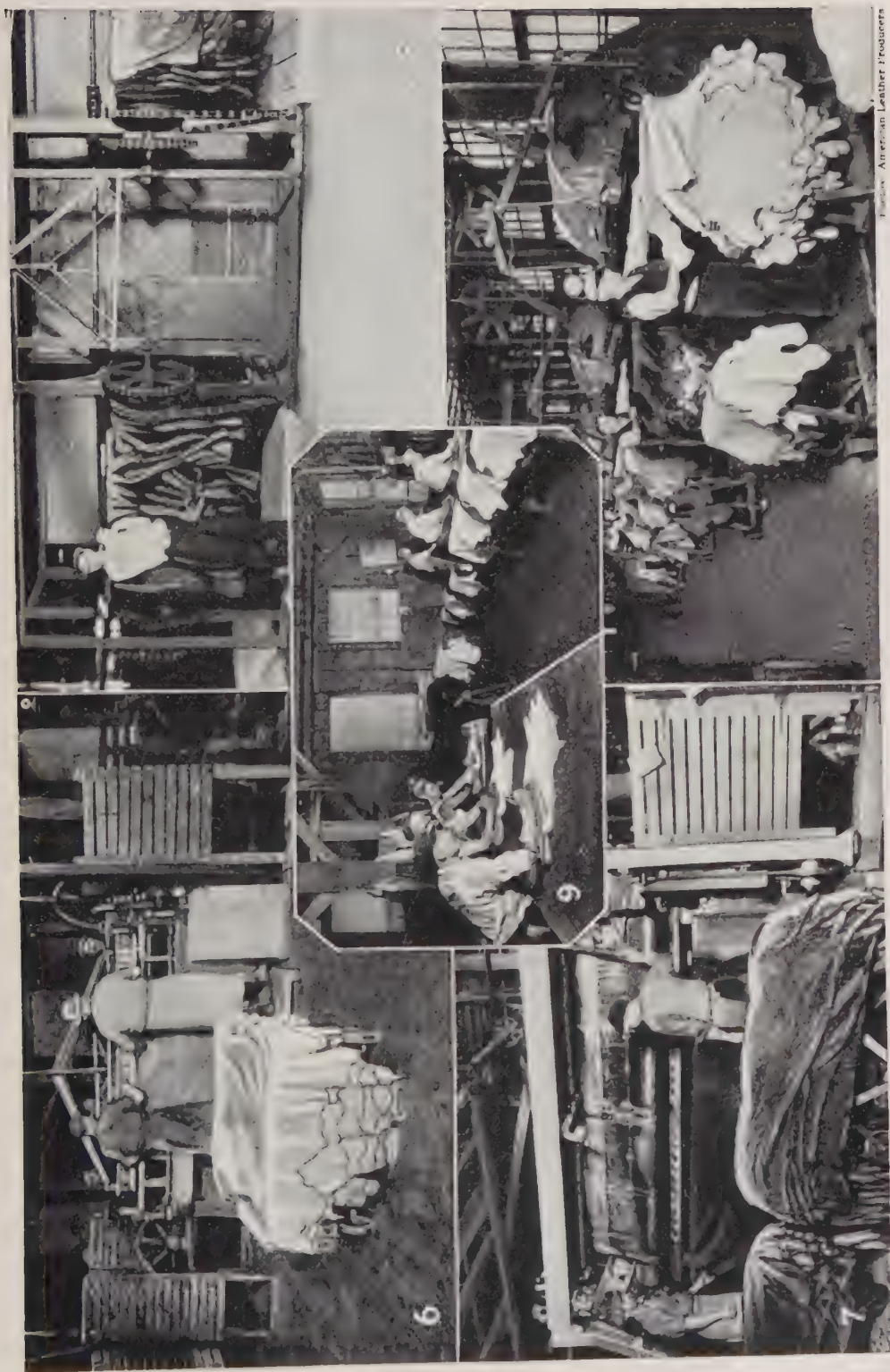
Following tanning, certain after treatment is necessary to finish the leather. Oils and greases, in varying quantity, are worked into the leather to replace those natural animal lubricants that have been removed in tanning. Sole leather is rolled; most light leathers are colored and finished to bring out the beauty of the natural surface of the leather.

A suede leather is made by holding the flesh side against a buffing wheel, which raises



The Making of Leather. (1) Salting hides before shipment to the tannery. (2) Running hides through lime solution to remove hair. (3) Removing bits of hair and flesh by hand. (4) The tannery, where tanning solutions convert hides into leather. (5) Shaving the flesh side, to smooth the surface.

Photo: American Leather Tanners



How American Leather Producers

The Making of Leather. (6) Splitting hides, after tanning, to secure desired thickness. (7) Wringing moisture from hides. (8) Drying is completed in tunnels or lofts. (9) Boarding leather imparts tiny parallel creases. (10) The embossing machines achieve designs of beauty in graining.

the nap that gives this finish its name. A glazed leather is finished by rubbing its surface with a glass cylinder. An embossed leather is made by subjecting its naturally smooth surface to great pressure under plates engraved with the desired design. Patent leather is usually made from cattle hide by coating leather of the desired weight with varnish-like materials.

The American Industry. Leather made in America is unexcelled in quality. The states leading in leather manufacture are Massachusetts, Pennsylvania, New York, and Wisconsin. The value of the annual production is approximately \$500,000,000; in 1926 the United States exported leather that had a valuation of about \$50,000,000.

Artificial Leather. Under various trade names, a product resembling leather in appearance is found on the market, and is used for many of the purposes of the genuine article. Automobile upholstery, book-bindings, interior decorations, bags, and suitcases are made of the material which manufacturers prefer to call *substitute leather*, not liking the implication of the term *artificial*. Substitute leather has been manufactured since 1849, but the product now made is much superior to the early fabric, especially in durability. A closely woven fabric with a heavy pile is used as a basis. This is called *moleskin*. The cloth undergoes dyeing and drying processes, is passed through napping machines, and then coated with a preparation of nitrated cotton. When properly coated, the fabric is placed in embossing machines which impress on the surface the desired pattern, often similar to the natural grain of some leather.

In modern factories it is possible to produce high-quality substitutes having very nearly the appearance of genuine leather. H. J. P.

LEATHERBACK, OR LEATHERBACK TURTLE. See TURTLE.

LEAVEN, *lev' un*. See BREAD.

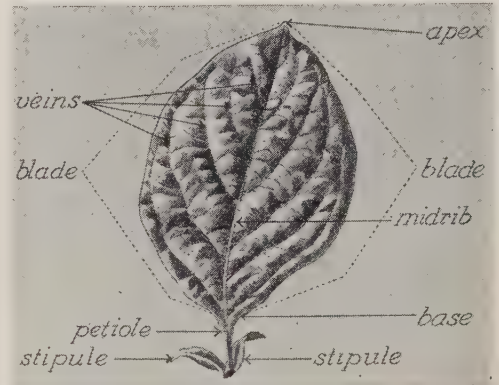
LEAVENWORTH, *lev' en wurth*, KAN. See KANSAS (back of map).

LEAVES, *leevz*, which clothe the trees in summer with garments of green, and array them in autumn with gorgeous reds and yellows, are indispensable plant organs. They occur in bewildering variety and beauty; yet they were not developed merely to be "the green sunshades over our heads," or the "thousand whispering tongues of the forest." The leaf is the builder of the plant; as John Ruskin has said in his *Modern Painters*—

It leads a life of endurance and effort; it connects itself with the whole previous edifice by one sustaining thread, continuing its appointed piece of work all the way from top to root.

How the Leaf Is Made. As will be shown, the leaf performs its work for the plant by using the sunlight, and it has been constructed so as to absorb as much as possible of that life-supporting energy. The typical leaf, therefore, is a thin, flat outgrowth of the stem, expanded, in most cases, horizontally. Its

upper and lower surfaces are covered with a thin, differentiated cell layer, free from leaf green except in special cells. These investing layers are called the *epidermis*, and between these coverings are several layers of cells. The green color of the leaf is due to a substance called *chlorophyll*, or leaf green, found in certain of the inner cells. Running through the



PARTS OF A LEAF

leaf are threads of fibrous or conducting tissue, forming *ribs* and *veins*. In the epidermis are numerous minute openings (*stomata*). These make possible the interchange of air between the leaf and the enviroing air. The chief parts of a complete leaf are the expanded portion, or the *blade*; the leafstalk, called the *petiole*; and two expansions at the base of the petiole, known as *stipules*.

Forms of Leaves. Of all the countless leaves borne by plants year after year, no two are exactly alike, but botanists classify them according to certain prevailing types of formation. Every leaf may be placed in one of two great divisions, *simple* and *compound*, but there are many varieties of both simple and compound leaves. To the former class belong those whose blades form one continuous piece; to the latter, those leaves which consist of several leaflets, each united to a common stalk, or midrib, by its own stem. Simple leaves are sometimes deeply cut into lobes, as in the case of the oak and maple. Compound leaves are said to be *pinnately* divided when the leaflets are arranged along the sides of the midrib; and *palmately* divided when they radiate from the petiole. The terms *pinnate* and *palmate*, as indicated by the illustration, on page 3914, refer to the shape of the leaf; the one is derived from the Latin *pinnatus*, meaning *feathered*; the other, from *palmatus*, meaning *marked with the palm of the hand*.

Ruskin, quoted above, has described, in his picturesque fashion, the wonderful variety of form assumed by the foliage of the plant kingdom:



Photo: U & U

GIANT LEAF OF THE KLADDI PLANT

This is a product of Sumatra. Several persons can hide behind one of these leaves without difficulty.

Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from footstalk to blossom, they seem perpetually to tempt our watchfulness and take delight in outstripping our wonder.

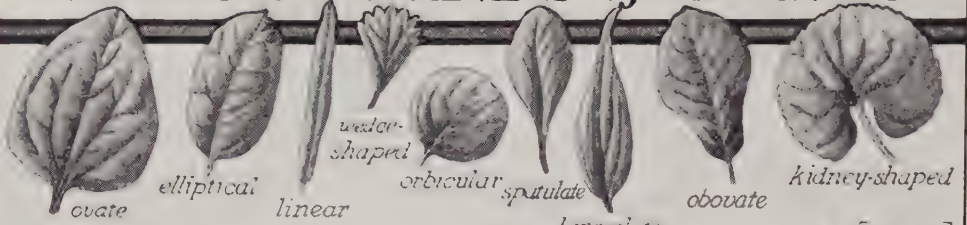
Some of the most familiar forms of the leaf blades and their marginal variations are shown in the plate previously mentioned. Leaves also vary greatly in size, ranging from the minute forms of such plants as the arbor vitae to the giant leaves of many water plants and palms. The leaves of the *Victoria regia*, a plant found on the lakes of Guiana and Brazil, are six feet in diameter, large enough to provide a standing place for water-fowl while watching for their prey. A Central American "palm" of the arum family has been known to bear leaves thirteen feet long.

According to the character of their veining, leaves are said to be *netted-veined* and *parallel-veined*. When all the veins of a netted-veined leaf rise from a single rib, the leaf is pinnately veined, and when they run through the blade like the toes of a web-footed bird, the leaf is palmately veined. Parallel-veined leaves, also, are of two types, those in which the threads run lengthwise through the blade, and those with parallel veins extending from

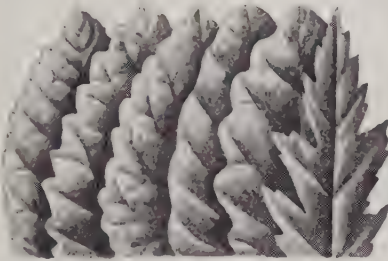
the midrib to the margin (see illustration). The two general types of leaf arrangement on the stem, *opposite* and *alternate*, are also shown in the illustration.

The Work of the Leaf. The most important function of the leaf is the manufacture of sugar and starch for the nourishment of the plant. This is a process the precise chemistry of which is not fully understood. Carbon dioxide is constantly absorbed from the air through the openings in the epidermis; water reaches the leaf in adequate quantity by way of stem and root. Both raw materials are then present in the living cells of the leaf. Energy from the sun's rays is absorbed by the chlorophyll in the leaf, and this energy is the power which is required to rearrange the carbon, hydrogen, and oxygen of the crude materials, so that a simple organic product results. This simple organic product, with further chemical change, becomes sugar and starch. There is an excess of oxygen, and this diffuses into the atmosphere. This marvel of plant life can take place only in the light, and, with negligible exceptions, it is characteristic only of plants that contain chlorophyll. It is a function not possessed by parasitic plants, which live on others, nor by those, like molds, toadstools, and yeast, which live on decaying organic matter.

VARIOUS KINDS of LEAVES



Variations in general outline



a-serrate, or saw-toothed
b-dentate, or toothed
c-crenate, or scalloped
d-repand, undulate, or wavy
e-sinuate
f-incised, cut, or jagged
Marginal forms

[Canna]

[Solomon's Seal]

[Melon]

Parallel
veining

[Fox
glove]

Netted
veining



[Horse-
chestnut]

Pinnately
compound

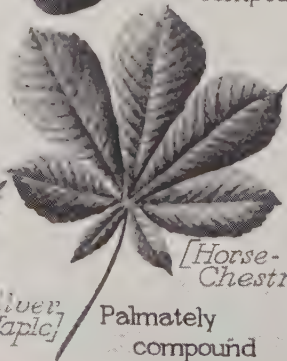
[Apple]

Alternate
arrangement

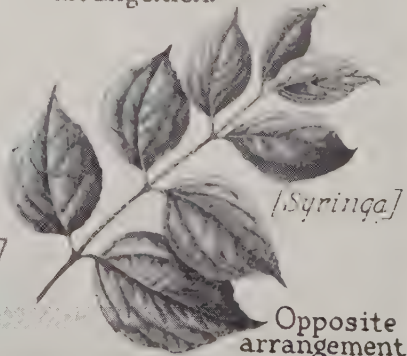
Simple



Simple
deeply cut



Palmately
compound



Opposite
arrangement

By means of their stomata, leaves absorb oxygen and give off carbon dioxide. Roots and stems are proportionately active, though they may not possess stomata. This kind of gas exchange with animals begins with the activity of the lungs. The amount of oxygen used and of carbon dioxide set free, however, is very small compared with the amount of each gas involved in the starch-making process, active during exposure to sunlight. Furthermore, the interchange of gas in the process of oxygen absorption and carbon-dioxide elimination of plants is not the fundamental part of that function. What is of importance is the decomposition of complex substances, with which the oxygen is concerned, and the consequent release of energy. This energy the plant uses to carry on its work. All living cells or organisms require oxygen. That is fundamental. Superposed upon that requirement is the additional one, on the part of the plant, of requiring carbon dioxide when it is manufacturing organic food. In fact, during sunlight this carbon-dioxide requirement is, in respect to quantity, the larger one.

A significant result of the necessary structure of the leaf is that of *transpiration*, or the giving off of water into the air. Surprisingly large amounts of water are given off by various plants through their leaves: 2,250 gallons are transpired in a single summer by a beech tree 110 years old; an oak having 700,000 leaves will give off each day about 180 gallons. This moisture represents the surplus water of the crude sap which circulates through the tissues of the plant.

In hot, dry weather, plants sometimes wilt because they are giving off more water than they are securing from the soil, and through the incipient wilting that results there are interesting examples of adaptation to conditions. The leaves of a corn plant, for instance, often roll up, thus tending to keep the plant from further wilting, for a curled leaf exposes much less surface to evaporation than one whose blade is fully expanded.

Why the Leaves Fall. In the tropical regions, trees usually keep most of their leaves the year round, and this is true also of such northern evergreens as the pines, spruces, etc. But the greater number of the common forest trees that grow in temperate climes pass through the long winter months without their leafy garments. There are two reasons why the annual fall is essential to the life of the tree. During the cold season, when the ground is near or at the freezing temperature, the roots of a plant are unable to absorb much soil water, and if the broad-leaved trees retained their foliage, the leaves would give off so much water the trees would dry up and die. Furthermore, in countries where there is heavy snowfall, the branches of the trees would be-

come overburdened with snow if the leaves remained on them, and would consequently suffer injury. Thus the loss of leaves is an adjustment to the survival of broad, thin-leaved plants.

Important changes take place in the cells of the leaf before its work is over, for its valuable food materials are largely reabsorbed by the branches and roots to be used again the following spring. Across the base of its petiole a layer of cork cells forms, and, as conditions change, there is a break at this point. Then the leaf falls to the ground, forming, in time, with thousands of its fellows, the leaf mold that is characteristic of the forest floor. So it happens that even the dead leaves are useful; the rains dissolve out the mineral contents, the organic matter decays, and these all help in fertilizing the soil. It is a pretty fancy that the gorgeous colors of the "painted autumn leaves" are solely the work of the frost, but scientists tell us that the leaf turns red or golden because of the chemical changes that take place in its cells, and while cool nights and the gradual oncoming of light frosts are important intensifying conditions, heavy frosts would cut short these changes.

In Decorative Art. Leafage is a favorite form of decoration in wood carving, pottery, ornamental sculpture, and architecture. The conventionalized acanthus leaf is the characteristic decoration of the Corinthian column, one of the classic forms in Greek and Roman architecture. The vine, olive, laurel, and ivy were other popular leaves used in Greek and Roman ornamentation, and the lotus leaf appears frequently in Egyptian art. B.M.D.

Related Subjects. The reader is referred in these volumes to the following articles:

Acanthus	Oxygen
Carbonic-Acid Gas	Parasite
Chlorophyll	Tree
Column	Venation

LEBANON, MOUNTAINS OF, a mountain range of Syria extending for 100 miles parallel to the eastern shore of the Mediterranean Sea, on whose slopes in Bible times flourished the famous "cedars of Lebanon" that King Solomon used in the building of the Temple (see *I Kings*, v). Only a few groves of these fragrant and beautiful evergreens remain [see CEDAR (Cedars of Lebanon)]. The poet Spenser has quaintly expressed, in the following lines, the kinship between tree and mountain:

High on a hill a goodly Cedar grewe,
Of wond'rous length and straight proportion,
That farre abroad her daintie odours threwe;
'Mongst all the daughters of proud Libanon,
Her match in beautie was not anie one.

The name Lebanon is derived from the Semitic *laban*, meaning *to be white*, and is supposed to refer to the bare, white walls of chalk or limestone that are characteristic of the en-

tire range. Parallel to it on the east, beyond a narrow, fertile valley, is the range known as Anti-Lebanon. The Lebanon is the loftier of the two ranges, having an average elevation of from 6,000 to 7,000 feet, while the summits of its highest peaks, Dahr el-Kodib, El-Miskiyeh, and Jebel Makmal, are over 10,000 feet above the sea. The celebrated Mount Hermon is at the southern end of the Anti-Lebanon range. A railway extends over the mountains from Beirut to Damascus. See PALESTINE (The Land); SYRIA.

LEBANON, PA. See PENNSYLVANIA (back of map).

LE BLANC, le blahN', NICHOLAS. See SODIUM.

LE BRETON, LILLIE. See LANGTRY, LILLIE.

LEBRUN, leh bruN', MARIE-ANNE ELISABETH VIGÉE. See VIGÉE-LEBRUN, MARIE-ANNE ELISABETH.

LECKY, WILLIAM EDWARD HARTPOLE (1838-1903), an historical writer, whose works rank among the most interesting and valuable literary products of his time. He was a native of Ireland, and received his education at Trinity College, Dublin. He represented the University of Dublin in Parliament, and later was honored with membership in the Privy Council, from which he resigned in 1902.



Photo: Brown Bros.

WILLIAM E. LECKY

As a Historian. Lecky's *History of the Rise and Influence of the Spirit of Rationalism in Europe*, published in 1865, attracted a great deal of

attention, and has done more than any other of his works to perpetuate his fame. His *History of European Morals from Augustus to Charlemagne* appeared in 1869. More than one-third of the first volume is devoted to a discussion of the intuitive character of morality. His essay on *The Conversion of Rome* was the subject of much scholarly and theological debate, and helped to make the book a subject of wide popular interest. In 1878 he published the first two volumes of a *History of England in the Eighteenth Century*; six more volumes, completing the work, were published within the next ten years. In 1891 Lecky published a volume of poems, and in 1896 a two-volume work, *Democracy and Liberty*.

LECLANCHÉ, leh klahN sha', CELL. See ELECTRIC BATTERY.

LECOMPTON CONSTITUTION. See KANSAS (History).

LE CONTE, le kont', JOSEPH (1823-1901), an American scientist and teacher, known in two hemispheres for his work in popularizing geol-

ogy. He was born in Liberty County, Ga., became the pupil of Agassiz in 1850 at Harvard University, and accompanied him on a scientific expedition to Florida. Le Conte's most active scientific career began in 1868, when he was called to the University of California as professor of geology. He made contributions to geology and zoölogy, and wrote a great many papers and books on the theory of evolution and the relations of science to religion.

Representative Works. Among his works are *Religion and Science*; *Elements of Geology*; *Compend of Geology*; and *Evolution: Its Nature, Its Evidence, and Its Relation to Religious Thought*.

LEDGER. See BOOKKEEPING.

LEE, ANN. See SHAKERS.

LEE, CHARLES (1731-1782), an American military officer whose inglorious record during the Revolutionary War culminated in his dismissal from the service, following his court-martial for misconduct at the Battle of Monmouth (see REVOLUTIONARY WAR). He was born in England and served in the British army before he joined the colonial forces, being one of Braddock's officers in the disastrous expedition against Fort Duquesne (which see). Two years before the opening of the Revolution, Lee emigrated to America, joined with the patriots in their struggle against Britain, and in 1775 was appointed senior major general, next in rank to Washington. The following year he was given credit for the brilliant defense of Charleston, S. C., though the honors fell properly to William Moultrie (which see).

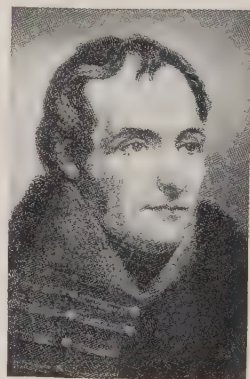


Photo: Brown Bros.

CHARLES LEE

From this time on, Lee was a hindrance, rather than an aid, to Washington. By refusing to attack the left wing of the British, at the Battle of Monmouth (1778), as commanded by his superior officer, he almost caused the utter rout of the Americans, Washington's timely arrival being the only thing that saved the day. Court-martialed for disobedience, he was suspended from his command for a year, and soon after was dismissed from the army for writing a disrespectful letter to Congress.

LEE, HENRY (1756-1818), an American soldier and statesman of the Revolutionary period, whose activity in scouting and outpost duty won him the name of LIGHT-HORSE HARRY. He also was the originator of the

well-known phrase, "First in war, first in peace, first in the hearts of his countrymen," spoken by him in a funeral oration delivered before Congress after the death of Washington. It should also be noted that he was the father of Robert E. Lee.

Henry Lee, who belonged to the famous Lee family of Virginia, was graduated from Princeton College two years before the colonies and the mother country began hostilities, and soon after the outbreak of the war, he offered his services in behalf of the American cause. In 1780, having attained the rank of lieutenant colonel, he led his band of cavalry troops, the famous "Lee's Legion," into the South. There his horsemen formed the rear guard of the American forces during General Greene's retreat through the Carolinas, and highly distinguished themselves at the Battle of Eutaw Springs.

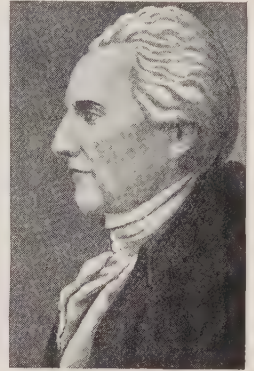


Photo: Brown Bros.

HENRY LEE

After the war Lee was a delegate to the Continental Congress and to the Virginia convention which ratified the Federal Constitution; was governor of Virginia from 1792 until 1795; and while holding the latter position, took charge of the troops sent by President Washington in 1794 to crush the Whisky Insurrection (which see). In 1799 Lee entered Congress, retiring to private life in 1801. Shortly after the outbreak of the War of 1812, he was appointed major general, but before he could resume his military duties, he received a severe wound while helping to quell a political riot in Baltimore. From the effects of this injury he never recovered.

LEE, RICHARD HENRY (1732-1794), a statesman and patriot of the colonial and Revolutionary period. He was identified with the patriotic party in Virginia, and was recognized as one of the ablest leaders of his time. He was born at Stratford, Va., and was educated in England. From the beginning of the struggle against Great Britain, Lee was actively in sympathy with the colonists, and was a recognized leader in the first Continental Congress (1774), in which he sat as a delegate from Virginia. He prepared such able addresses to the king, the people of England, and the colonies that the Earl of Chatham (William Pitt) declared that "for solidity of reasoning, force of sagacity, and wisdom of conclusion, under such complication of circumstances, no nation or body of men could stand in preference to the general Congress at Philadelphia."



RICHARD HENRY LEE

The most celebrated of all Lee's speeches was made on June 7, 1776, when he introduced before the Congress at Philadelphia the celebrated motion that "these united colonies are, and of right ought to be, free and independent states, absolved from all allegiance to the British Crown." In 1784 he became president of Congress, and was elected to the Senate from Virginia after the Federal Constitution was adopted. He opposed some of the provisions of the new Constitution, on the ground that the powers of the states were infringed upon, and thus first brought up the question of states' rights; but he saw that it worked well in practice, and he became a warm supporter of the new government.

The STORY of ROBERT E. LEE

Birthplace at Stratford,
Westmoreland County, Va.

Confederate Flag

Recumbent Statue.
Lexington, Va.

LEE, ROBERT EDWARD (1807-1870). This great commander in chief of the armies of the Confederacy was so upright in character that the fame which has grown steadily since his death is founded nearly as much on that as on his military achievements in the face of

the most heartbreaking difficulties. The North against which he fought with all the energy of his nature now holds him in as gracious remembrance as does the South which he served.

Early Life. "When should the education of a child begin?" someone once asked Oliver

Wendell Holmes. "Two hundred and fifty years before he is born," was the instant reply; and the life of Lee is a good example of what beginning a man's education two hundred and fifty years before he is born can do for him. His family, in England and later in the colony of Virginia, was illustrious in peace and in war, the names of Francis Lightfoot, Richard Henry, and Henry Lee standing out prominently in colonial and Revolutionary history. The last-named, the famous cavalry leader best known as "Light-Horse Harry," was the father of Robert E. Lee, who was born on January 19, 1807, at Stratford, Westmoreland County, Va. He grew up with a passionate devotion to his native state, which was then the leader among all the states, and that devotion continued to the end of his life.

Sent in 1825 to the Military Academy at West Point, he passed his four years there without receiving a demerit or even a reprimand, and was graduated second in his class. Two years later, on June 30, 1831, he married Mary Parke Custis, the great-granddaughter of Washington's wife, and took up his residence at Arlington. In 1834 he became assistant to the chief engineer of the army at Washington, and later superintended the construction of defensive works in New York Harbor.

From the Mexican War to the War of Secession. Lee's brilliant services in the Mexican War won him the brevet rank of colonel (see BREVET), but he received the fullest commendation from General Winfield Scott, who

is reported to have declared that his "success in Mexico was largely due to the skill, valor, and undaunted courage of Robert E. Lee, . . . the greatest military genius in America." After spending three years at engineering work in Baltimore, Lee became superintendent at

West Point in 1852, and in his three years' term left a decided impress upon the institution. Made lieutenant of engineers in 1855, he spent the greater part of the next six years in Texas, away from his beloved Arlington, but happened to be at home in 1859 at the time of John Brown's raid, and was placed in command of the troops sent to suppress it. This accomplished, he returned to his regiment and there remained until 1861, when Texas seceded and he was summoned home.

Lee was opposed to the breaking up of the Union; he felt that slavery was an even "greater evil to the white than to the colored race," and he had several years before freed the few negroes which he had inherited; but loyalty to his state made him refuse the command of

the United States army when it was offered him in April, 1861, and he accepted the leadership of the Army of Virginia. It caused him the greatest grief to part from his companions in arms, for he had always felt "that the cordiality and friendship in the army was the great attraction of the service," and the break with General Scott, his commander in chief, was particularly hard. Appreciating his military genius, President Jefferson Davis very shortly raised him to the highest army rank.



GENERAL ROBERT E. LEE

Photo: U & U



Photo: Keystone

BIRTHPLACE OF ROBERT E. LEE

The building and grounds, at Stratford, Va., were purchased by the United Daughters of the Confederacy, to be preserved as a national shrine. The building was planned in 1729, when Queen Caroline, wife of George II of England, gave £300 toward its cost, as a gift to the Lee family. Not only was this the birthplace of the great leader of the Confederate armies in the War of Secession, but also of Richard Henry Lee, who introduced the Declaration of Independence in the Continental Congress.

The Great Struggle. For a time Lee had no army under his command, but remained with President Davis as his military adviser, and thus had no active part in the first Battle of Manassas, though his plans were in large part responsible for its success. Later, in the summer of 1861, he took the field, but not for almost a year was he engaged in any movements of primary importance. Then, in June, 1862, he took command of the armies in the Peninsula, and in a series of sharp engagements in the neighborhood of Richmond, drove the Federals from the Confederate capital.

Afterward he turned his attention from McClellan toward Pope, who commanded the Federal army in Western Virginia, and on August 29 and 30 he and "Stonewall" Jackson won a decisive victory over Pope—the second Confederate victory of Manassas, or Bull Run. Assuming the offensive, Lee next crossed into Maryland with the intention of threatening Washington, but his army was checked at Antietam, and he was compelled to retreat across the Potomac.

On the Defensive Again. Intrenched at Fredericksburg, Lee awaited the Federal army, which was again being directed against Richmond. Burnside, the Federal commander, attacked, and Lee's army drove him back with great loss, but Lee was unable to take advantage of his victory because the Federals had been so placed that they could fall back without endangering their line of communica-

tion. Lee knew that the Confederate reserves in men and in supplies were shrinking rapidly, and that victories which simply held the enemy's forces, but did not destroy them, were too costly to be indulged in. Yet another defensive battle had to be fought, and on May 2-4, 1863, at Chancellorsville, Lee won over Hooker one of his most brilliant victories. Lee suffered in this battle an irreparable loss, for Stonewall Jackson, his most efficient aid, was fatally wounded by Confederate marksmen, who fired upon him by mistake.

A Losing Fight. Determining now on a more aggressive campaign, Lee led his forces into Pennsylvania, and on July 1 began the most famous conflict of the war—the Battle of Gettysburg. In three days of fighting, he showed distinguished ability, and his army the utmost bravery, but they were overborne by the Federals under Meade, and were compelled to retreat across the Potomac. The greatness of Lee's character was as evident in this defeat as in his most brilliant victories, for he insisted on taking upon himself all the blame for the failure of the campaign, just as at Chancellorsville he had given all the credit for the victory to Jackson.

After a hard winter, Lee's forces found themselves in the spring of 1864 called upon to face a new Federal leader—the determined General Grant; and during May and the early part of June there occurred in the "Wilderness" a series of the fiercest and bloodiest engagements



Photo: U & U

THE ARLINGTON HOME OF LEE

The Lee mansion, the picturesque Southern home of the Custis and Lee families, now located in the Arlington National Cemetery, close to Washington, D. C.

of the war. The Federals lost more men than the Confederates, but they had greater reserves and more abundant supplies. Later, during the protracted siege of Petersburg, this costly warfare continued, Lee being unable at any time to gain a permanent advantage. Finally, abandoning Petersburg and Richmond, Lee retreated, and at Appomattox Court House, on April 9, 1865, surrendered to General Grant. Never, throughout the struggle, were his dignity and greatness more evident than in the way he met this final failure of the cause for which he had striven; the generous Grant did all in his power to spare Lee humiliation.

Attitude of Lee's Soldiers. Never was a commander more devotedly loved by his soldiers; their loyalty was shown most strikingly in this hardest hour of his life. Says a recent biographer:

When Lee returned to his own lines, he was received with a shout of welcome, which died into a sad silence when his recent mission was recalled. With head bare and tears flowing down his cheeks, he said, "Soldiers, we have fought through the war together. I have done the best for you I could." The men crowded about him. Many wept; while hundreds attempted

to take his hand or touch his person or even his horse—

that famous horse, "Traveler," which had been his companion throughout the war.

Last Years. For the first time in forty years Lee was then a private citizen, but his services to his country were not over; for his dignified, manly acceptance of the state of affairs did more than all the Federal garrisons to bring the Southern people everywhere to a like point of view. He refused to accept any office in his own state, fearing that his appearance might inflame sectional bitterness, and he did

all in his power to spread a kindly feeling toward the North—a feeling none too natural at that time because of the character of most of the Northerners then active in the South.

On August 5, 1865, Lee was offered the presidency of Washington College, at Lexington, Va., now Washington and Lee University. He accepted the offer, as he himself declared, to "educate Southern youth into a spirit of loyalty to the new conditions." He was inaugurated October 2, 1865. But his services there were brief, for his health failed



MONUMENT AT RICHMOND

early in 1870, and a visit in the South failed to bring him any lasting relief. He died on October 12, 1870, after a short illness, his mind dwelling at the last on his military experiences; for he exclaimed, shortly before the end, "Strike the tent," and then, "Tell Hill he must come up." His body was laid in the College Chapel at Lexington, and a Virginia sculptor, Valentine, carved the reclining statue which marks the spot. Not only in the South, but throughout the country, his death was felt as a personal loss. In the words of the distinguished English soldier, Lord Wolseley, there is perhaps as true a picture of him as may be found:

I have met many of the great men of my time, but Lee alone impressed me with the feeling that I was in the presence of a man who was cast in a grander mould and made of different and finer metal than all other men. He is stamped upon my memory as a being apart and superior to all others in every way—a man with whom none I ever knew, and very few of whom I have read, were worthy to be classed.

Related Subjects. The reader is referred to the article **WAR OF SECESSION** for a fuller account of Lee's military career. See, also, **LEE, HENRY; GRANT, ULYSSES S.**

LEE, WILLIAM, inventor of the knitting machine (which see).

LEECH, a large division of ringed worms, known also as *bloodsuckers* because of their characteristic habit of sucking the blood of other animals. These worms live for the most part in fresh water, but some inhabit moist, grassy places and others dwell in the sea. They have flattened, segmented bodies, from two to ten pairs of eyes, and digestive



LEECHES

Their length is from one-half inch to three or four inches.

sucking organs are two discs, one at each extremity of the body. The best-known leech is the one used for medical purposes, which was considered indispensable in the days when physicians practiced blood-letting to cure almost every ailment. This leech has a mouth in the middle of the front sucking disc, provided with three small white teeth. With these sharp, sawlike projections the worm makes a wound which permits a large flow of blood. See **WORMS**. S.H.S.

Scientific Name. Leeches constitute the class *Hirudinea* in the phylum *Annelida*. The medicinal leech is *Hirudo medicinalis*.

LEEDS, ENGLAND, the fifth city in population in the country, and one of the most important industrially. It is on the River Aire, in Yorkshire, close to great coal fields; the river carries its commerce to the east coast,



LEE'S BIRTHDAY

SUGGESTED PROGRAMS

I

The better rule is to judge our adversaries from their standpoint, not from ours. — Lee.

Star-Spangled Banner

Essay, *Lee's Preparation for His Greatest Work*

The Land Where We Were Dreaming.....Lucas

Essay, *Lee's Services to the Confederacy*

Marse Robert's Asleep.....Valentine

The Sword of Lee.....Father Ryan

Lee's Farewell Address to His Soldiers

The Blue and the Gray.....Finch

Essay, *The Years After the War*

The Better Way.....Coolidge

Confederate memory gems
Dixie

II

Remember! we are one country now. Dismiss from your minds all sectional feeling and bring up your children to be, above all, Americans. — Lee.

How Firm a Foundation

(Lee's favorite hymn)

Tributes to Lee

Nobility.....Alice Cary

Essay, *Lee's Ancestors*

The March of the Deathless Dead

.....Father Ryan

The Nineteenth of January

Essay, *The Battle of Chancellorsville*

The Conquered Banner..Father Ryan

Essay, *Why the North Loves Lee*

After Appomattox

Tenting on the Old Camp Ground



and a canal affords water transportation to the west coast at Liverpool. Railway facilities are unexcelled. Leeds is the English center for the manufacture of woolen goods, and surpasses all other cities in the manufacture of ready-made clothing; the making of artificial silk and the manufacture of boots and shoes also employ large numbers of people. The history of the city dates back to the seventh century; situated in the factory district are the ruins of an abbey founded in the twelfth century. Population, 1927, 482,600 (official estimate).

LEE-ENFIELD, a rifle. See **RIFLE**.

LEEK, a hardy biennial belonging to the lily family, with a strong odor somewhat like that of the onion, though less pronounced. Instead of having a bulb like the onion, however, the leek has a thickened, elongated stem; under cultivation the stem and leaf bases are covered with earth, a process which blanches them (see **ETIOLATION**). In this form they are a popular flavoring for soups, stews, and salads in Europe, especially in France. Americans have never become accus-



THE LEEK

tomed to using the leek freely, as the flavor does not appeal to them. The plant was formerly the emblem of the Welshmen, who wore a sprig on Saint David's Day, March 1. The daffodil is now used, as it has been adopted as the national flower of Wales. Gardeners sometimes plant leeks in neat patterns which at a distance resemble paintings. For this purpose they are especially suited because of their trim and compact form. B.M.D.

Scientific Name. The leek belongs to the family *Liliaceae*. Its botanical name is *Allium porrum*.

LEEUEWENHOEK, *la' ven hook*, ANTON VAN. See **BACTERIA** AND **BACTERIOLOGY** (Bacteriology).

LEEWARD ISLANDS, a British colony in the West Indies, divided into five presidencies under one governor. These are Antigua (and dependencies), Saint Kitts (and dependencies), Dominica, Montserrat, and the British Virgin Islands. The population is over 122,000 and the area is 715 square miles. The colony has an executive council nominated by the Crown, and a legislative council of twenty, ten nominated and ten elected. The legislative council meets once a year at Saint John, Antigua. The name

Leeward was applied to this portion of the West Indies from the fact that they are less exposed to the prevailing trade winds than are the adjacent groups. See **WINDWARD ISLANDS**.

LEFFINGWELL, an English officer who was given the site where Norwich, Conn., now stands. See **UNCAS**.

LEGACY, *leg' a sie*, a gift of property, especially personal property, by will. The law provides that the debts of a deceased man must be paid before legacies can be considered. Gifts of particular objects (*specific legacies*) rank next after debts are paid. If the remainder of the estate is not sufficient to pay the *general legacies*, they are reduced in proportion to their amount. See **AGE**, subhead.

LEGAL AGE. See **AGE**, subhead.

LEGAL INTEREST. See **INTEREST**, table of rates.

LE GALLIENNE, *le gal i en'*, RICHARD (1866-), a poet, critic, essayist, and lecturer, born in Liverpool, England, but since 1898 a resident of the United States. After seven years of business life, following his graduation from Liverpool College, he turned to a literary career, serving for a brief time as private secretary to the actor, Wilson Barrett. In 1891 he became literary critic of the London *Star*, later joining the staffs of the *Daily Chronicle* and *The Speaker*. As the result of a spirited discussion between Le Gallienne and Robert Buchanan on the question *Is Christianity Played Out?* the former wrote and published *The Religion of a Literary Man*. After making a lecture tour of the United States and Canada in 1898, he settled permanently in America. His daughter Eva, a talented actress, established a repertory theater in New York in 1926.



Photo: Brown Bros

LE GALLIENNE

Literary Output. Le Gallienne is the author of much light, graceful verse, contained in such volumes as *English Poems*, *Odes from the Divan of Hafiz*, and *The Lonely Dancer and Other Poems*; the outbreak of the World War inspired a book of war verse, *The Silk-Hat Soldier*. Among later books of verse are *The Junk-Man* and *A Jongleur Strayed*. He also compiled *The Le Gallienne Book of English Verse*, *Anthology of American Verse*, and *The Romantic '90s*. Among his imaginative prose essays and sketches are *Prose Fancies*, *The Quest of the Golden Girl*, *The Life Romantic*, and *Vanishing Roads and Other Essays*.

The following lines from his *April* suggest the quality of his lyrical gift:

April, half-clad in flowers and showers,
Walks, like a blossom, o'er the land;
She smiles at May, and laughing takes
The rain and sunshine hand in hand.

So gay the dancing of her feet,
So like a garden her soft breath,
So sweet the smile upon her face,
She charms the very heart of death.

LEGAL TENDER, coin or other money which can lawfully be used for the payment of a debt. All gold coins of the United States are legal tender for both public and private payments when not below the standard weight prescribed by law; when reduced below standard valuation, they are legal tender in proportion to their weight. The standard silver dollar of $412\frac{1}{2}$ grains is legal payment without regard to the amount, unless otherwise stipulated in the contract. The so-called trade dollar, of 420 grains, is no longer coined and is not legal tender; nor is any commemorative coin, such as the issue of the Columbian Exposition, nor any foreign coin. The other silver coins of the United States, the half dollars, quarters, and dimes, are legal tender for sums not exceeding ten dollars. The minor coins, the five-, three-, and two-cent pieces and all pennies, may be tendered legally for all amounts not exceeding twenty-five cents. However, the two-cent and three-cent pieces are no longer coined. See **MONEY**.

Tender, in law, a formal offer to pay a debt, or to perform an obligation, which may be either in money or specific articles. A tender of payment does not cancel the debt, for the debtor is still liable for the payment, but it bars all claim to subsequent damages, and puts a stop to all interest and costs after the date of tender. The tender must also be unconditional, and if made in money, must be in currency or coin negotiable as legal tender; if delivery of property is tendered, it must conform to the contract.

Canadian Legal Tender. Under the Dominion Currency Act, a legal tender may be made in copper coins up to twenty-five cents, and in Canadian silver coins to the value of ten dollars. Dominion notes and gold coins are legal tender to any amount. The British sovereign is legal tender for four dollars eighty-six and two-thirds cents, and standard American gold coins are legal tender for their face value. During the World War, notes of all chartered banks were made legal tender for any amount.

LEGATE, *leg' ate*, a title now confined to the highest diplomatic representatives of the

Pope. The Papal legates were at first merely delegates to different divisions of the Church. Sometimes they possessed very high powers, and with the spread of the temporal power of the Pope, they began to figure in national affairs. Legates are now of three grades: in the first are the Pope's special representatives (*legate a latere*); in the second, permanent representatives at foreign capitals (see **NUNCIO**); in the third, certain archbishops. The dignity of *legate a latere* is restricted to cardinals.

Derivation. The word *legate* is from the Latin *legatus*, which means appointed.

LEGEND, *lej' end*, or *le' jend*, in modern usage, the term applied to an improbable or traditional narrative handed down from the past. The words *legend* and *myth* are sometimes used interchangeably, but, strictly speaking, the myth deals with supernatural beings, the legend with mortals. The former, too, is usually spread over a wide area, while the latter is apt to be local in character. Legendary tales are interwoven with the early history of all peoples. The first seven kings of Rome, for instance, about whom numerous traditions cluster, are known in history as the *legendary kings* (see **ROMULUS**). The Swiss people treasure the legend of William Tell (see **TELL**, **WILLIAM**), who typifies the spirit of resistance against a foreign oppressor. Among the well-known legends of literature is Chaucer's unfinished poem, *A Legend of Good Women*; Washington Irving has used the word in the title of one of his most picturesque stories, *The Legend of Sleepy Hollow*, based on the tradition of the Headless Horseman.

Originally, the term was applied to narratives connected with religious belief or worship, such as the *Golden Legend* of Jacobus de Voragine, a Dominican monk of the thirteenth century.

LEGERDEMAIN, *lej ur de mane'*, a word meaning *sleight-of-hand*, as used in the performance of conjuring tricks. See **CONJURING**.

LEGHORN. See **ITALY** (The Cities).

LEGHORN. See **POULTRY**, table of classes and breeds.

LEGION, *le' jun*. In modern times, this term has been applied to organizations of an unusual or uncommon character, such as the *American Legion*, an association of American



SOLDIERS OF THE ROMAN LEGION
This group of statuary is a part of the Arch of Constantine, in Rome.

veterans of the World War; and the *Legion of Honor*, a French order of merit. *Legion* is derived from the Latin *legio*, meaning a *levy*, and the ancient legion of Rome, the organization which made the word popular, was a military body, varying in numbers at different periods. In the time of the republic, it consisted of 4,500 men. In the time of Marius it consisted of ten cohorts of infantry; each cohort was divided into three maniples, and each maniple into two centuries. Each legion included sixty centurions, and the same number of optiones, or lieutenants, and standard-bearers. The eagle was the standard of the legion.

That the word had no military significance in Bible times is shown by the quotation: "And he asked him, What is thy name? And he answered, saying, My name is Legion: for we are many" (*Mark* v, 9).

LEGION, AMERICAN. See AMERICAN LEGION.

LEGION OF HONOR, an order of merit instituted by Napoleon in the year 1802, under the French republic, for recognition of conspicuous military and civil services. Its aim was to pave the way for the establishment of the empire by popularizing the idea of personal distinction. The order originally comprised three classes, grand officers, commanders, and legionaries. On the restoration of the Bourbon monarchy, the Legion was re-modeled and lost most of its original character. There are now five classes—chevaliers, or knights, officers, commanders, grand officers, and grand crosses.

The vast numbers of persons advanced to this order and the lack of merit of many of those on whom it has been bestowed have detracted much from its value. In 1872 its members numbered 69,179. A law was passed in that year decreeing that only one new member should be added for every two vacancies, which reduced the membership in the next five years to 59,208. The number of chevaliers is now limited to 25,000, the officers to 4,000, the commanders to 1,000, the grand officers to 200, and the grand crosses to 70. Pensions are paid to members of the order who have served in the

army or navy, but not to civilian members. Expulsion of members for offenses against the state is almost unknown. The emblem of the Legion of Honor is a white enameled star of five points, bearing an emblematic figure of the Republic, with the inscription *République Française*. On the reverse side are two flags, with the inscription *Honneur et Patrie* (Honor and Country).

LEGISLATURE, *lej' is la ture*, the lawmaking department of a nation or one of its states or provinces. In the United States the national legislature is called *Congress*; in England and Canada, it is called *Parliament*. The legislature of a state or province is sometimes known as *general assembly* or *legislative assembly*. Under whatever title they are known, the powers and duties of lawmaking bodies are practically the same, varying only to meet local needs. Legislatures are exclusively empowered to make laws and to amend and repeal them.

Usually, there are two groups, or houses, in a legislature. In the United States they are called the *Senate* and the *House of Representatives*; in Canada, the *Senate* and *House of Commons*; in England, the *House of Lords* and the *House of Commons*. The two bodies are independent of each other in minor respects, but are related bodies for the passage of laws, and a unit in the general scheme of government. One house alone cannot enact a law; the concurrence of both houses upon every detail of a bill is necessary. For an exception to this rule, however, see PARLIAMENT (The House of Lords).

The two houses of a legislative body in a state or province are usually organized after the manner of the higher lawmaking body of the nation; for example, a state legislature in the American Union finds its admirable pattern in the Congress of the United States. The legislative assembly of two Canadian provinces, Quebec and Nova Scotia, is quite similar in each case to the more important Dominion Parliament, each having two houses; the other seven provinces provide for only one house, called the legislative assembly.

Terms of service of members vary from one year to four, while compensation ranges from a stated sum for each day's actual service to a salary of several thousand dollars per year. In some states the constitution limits the length of a legislative session by depriving members of compensation after forty, fifty, or sixty days; another device for shortening a session is a constitutional provision that no new bills may be introduced after a stated number of days.

In cities there is a legislature, although it is not so called, for a city must have its full complement of local laws, which are termed ordinances; the legislative body is the *board of aldermen* or *common council*. The corre-



BADGE OF THE LEGION OF HONOR

sponding body in a village is the *board of trustees*.

E.D.F.

Related Subjects. The reader is referred in this connection to the following articles in these volumes:

Alderman	Law
Amendment	Lobby and Lobbying
Burgesses, House of	Local Option
Committee of the Whole	Parliament
Common Council	Pure-Food Laws
Congress of the United States	Representatives, House of
Delegate	Senate
Diet	Short Ballot
Duma	Speaker
Initiative and Referendum	Statute
Junta	Veto
	Zemstvo

LEGUME, *leg' ume*, or *le gume'*. See LEGUMINOUS PLANTS.

LEGUMINOUS, *le gu' mih nus*, **PLANTS**, OR **PULSE FAMILY**, the second largest family of flowering plants, ranking next to the composite family (which see). Many of the leguminous plants are of great economic importance in all parts of the world. Some, such as peas and beans, are valued as food plants. Others are used for medicines, dyes, timber, wood, or ornament; while alfalfa, clovers, and vetches are among the chief forage and pasture crops.

All have a strange and interesting power of taking nitrogen from the air by means of bacteria which live in wartlike growths, or nodules, on their roots. This power of bringing nitrogen to the plant and ultimately to the soil makes many of the legumes valuable as green manure and cover crops for the improvement of poor soils.

About 7,000 species of leguminous plants are known. Most of them, whether trees, shrubs, or herbs, bear their seeds in pods, or *legumes*; hence the family name, which the scientist calls *Leguminosae*. One large subfamily in this family bears flowers which resemble butterflies, and is therefore called *Papilionaceae*, from the Latin word for *butterfly*. The common sweet pea belongs to that group. Other legumes bear irregular, spreading petaled flowers; still others bear blossoms small and regular.

B.M.D.

Related Subjects. The following important members of this great family are treated in these volumes:

Acacia	Laburnum	Peanut
Alfalfa	Licorice	Sensitive Plant
Bean	Locust	Sweet Pea
Broom	Lupine	Tamarind
Clover	Melilotus	Vetch
Indigo	Pea	Wistaria

LEHI, *le' hi*. See MORMONS (The Book of Mormon).

LEHIGH, *le' hi*, **RIVER**, a tributary of the Delaware River, rising in the northeastern part of Pennsylvania near Wilkes-Barre; after a winding course of 120 miles, it empties into the Delaware at Easton. The part of the country through which it flows is rich in coal

and iron, and by means of locks and dams, the river has been made a navigable outlet for these products.

LEHIGH UNIVERSITY. See PENNSYLVANIA (Education).

LEHMAN, *la' man*, **CAVES.** See NEVADA; MONUMENTS, NATIONAL.

LEIBNITZ, *lipe' nits*, GOTTFRIED WILHELM, Baron von (1646-1716), a German philosopher and mathematician, was born at Leipzig. He was educated in the universities of Leipzig, Jena, and Altdorf. In 1667 he entered the service of the Elector of Mainz, then the most powerful man in the country, and in 1676 became the librarian of the Duke of Brunswick-Lüneburg, a post he occupied until his death. He prepared a history of the House of Brunswick, took an active part in negotiations for uniting the Roman Catholic and Protestant churches, and was the chief founder and first president of the Society of Sciences, afterward the Berlin Academy. He also prepared for Peter the Great the plan of the famous Academy of Saint Petersburg (now Leningrad). In 1712 he was made Imperial Privy Councilor



Photo: Brown Bros.

EARL OF LEICESTER (SEE NEXT PAGE)

and Baron of the Empire. His last days were spent in poverty and neglect; it was only in later times that his genius came to be fully appreciated. The writings of Leibnitz covered a wide field, including philosophy, theology, law, mathematics, history, and politics. He shares with Newton the honor of developing the theory of differential calculus.

LEICESTER, *les' tur*, **ENGLAND.** See ENGLAND (The Cities).



EXAMPLES OF LEIGHTON'S ART

At top, "Captive Andromache"; below, "Greek Girls Playing Ball."

LEICESTER, ROBERT DUDLEY, Earl of (1532-1588), fifth son of the Duke of Northumberland, and companion of Edward VI and Princess Elizabeth. On Elizabeth's accession to the throne, Dudley was held in high favor, and by many was regarded as her lover. In 1550 he married Amy Robsart, and was thought to have been an accessory to her murder ten years later. This episode is treated romantically by Scott in his novel *Kenilworth*. Dudley was created Earl of Leicester and Privy Councilor by Elizabeth, and for a time it was rumored that the marriage of the queen and Leicester was a certainty. There was great opposition in official circles to such an alliance, and Elizabeth publicly renounced any inten-

tion of marrying him. No one knew whether such a union had definitely been decided upon, but it was understood that he offended Elizabeth deeply by his marriage to the Countess of Essex. See ELIZABETH. See page 3925.

LEIDEN, OR **LEYDEN**, *li' den*. See NETHERLANDS, THE (The Cities).

LEIF ERICSON, *life ehr' ik sun*. See ERIC THE RED; CANADA (History); UNITED STATES (History: Discovery and Exploration); VINLAND.

LEIGHTON, *la' tun*, FREDERICK, Lord (1830-1896), a distinguished English painter, sculptor, and scholar. Few artists are so honored during life as was Leighton. He was not a great original genius, for his work was

the result of a painstaking pursuit of his art, but his lofty ideals, social distinction, and charm of personality made him one of the most popular figures of his day. He was born at Scarborough, and from early youth was granted every opportunity to perfect himself in the art which he loved. He first won recognition, in 1855, with his painting *Cimabue's Madonna Carried in Triumph through Florence*. During the next five years, Leighton lived in Paris, and then took up his residence in London. He received a medal of honor for sculpture at the Paris Exposition, in 1889, and the universities of Cambridge, Oxford, and Edinburgh conferred honorary degrees upon him. In 1878 he became president of the Royal Academy, and during his tenure of office, the institution enjoyed a material prosperity and social influence attained under none of his predecessors. He was created Lord Leighton the day before his death.



FREDERICK LEIGHTON

Representative Works. Leighton's paintings are characterized by finish of line and richness of coloring. In them he sought to express ideals of beauty suggested by the stories of classic mythology and history. Characteristic examples are *The Bath of Psyche*, *Clytemnestra*, *Electra at the Tomb of Agamemnon*, and *Clytie*. He also painted a few sacred subjects and occasional portraits, and executed some pieces of sculpture, notably *Athlete Strangling a Python* and *The Sluggard*. Two of his paintings, *Captive Andromache* and *Greek Girls Playing Ball*, are reproduced herewith in halftone.

LEIPZIG, *lipé' tsi K*, a commercial and educational center of Germany. It is situated in the former kingdom of Saxony, three miles above the junction of three small streams, the Elster, Pleisse, and Parthe. This interesting city is seventy-four miles northwest of Dresden, 111 miles southwest of Berlin, and about 500 miles northeast of Paris. It possesses the third largest German university, was the headquarters of the Supreme Court of the empire, and is one of the most prominent literary and musical centers of Europe. In the trades of bookselling and publishing, it occupies first place in Germany, and in normal times surpasses London and Paris in the number and value of its book sales. Over 500 houses are engaged in the book trade, and about 270 newspapers and periodicals are published. The *Baedekers*, those indispensable guide books for

travelers, are printed here. Wood carving and the manufacture of paper are also important industries.

The inner part of the ancient town, which is the hub of the business activity, has narrow streets and quaint houses, and is separated by a fine promenade from the more extensive modern suburbs, which, in turn, are edged by numerous busy manufacturing villages. Much of Leipzig's material prosperity has been made possible through its three great annual fairs, each lasting from three to five weeks, and held at New Year's, Easter, and Michaelmas.

In addition to the university, founded in 1408, there are many other educational establishments, including a conservatory of music founded in 1843 by Mendelssohn-Bartholdy, as well as other literary, artistic, and scientific institutions. Leipzig was the birthplace of Leibnitz and of Wagner. Bach was director



Photo: O R O C

BATTLE MONUMENT

It commemorates the "Battle of the Nations," in 1813, fought by the allies against the great Napoleon. The monument stands on the site of the battle, near the city of Leipzig.

of music there in two of its leading churches, and Mendelssohn was director of the Gewandhaus concerts for six years.

After the German revolution in 1918-1919, political difficulties arose in Leipzig, and in April, 1919, a Soviet republic was set up, but

was put down a month later by government troops. Population, 1925, 679,300.

Battles of Leipzig. Three famous battles were fought near Leipzig, two of them in the Thirty Years' War and one in the war with Napoleon. The first, which took place in September, 1631, resulted in victory for the Swedes and Saxons, under Gustavus Adolphus, over the imperial army under Tilly. In the second Battle of Leipzig, or Breitenfeld, which occurred in November, 1642, the Swedes were again victorious over the Imperialists. The third was the great victory of the allied Prussians, Russians, Austrians, and Swedes over the French under Napoleon, in 1813. This engagement, which is also called the "Battle of the Nations," practically secured Germany's freedom. See BONAPARTE, NAPOLEON.

LEIRIOPE, wife of Cephissus, and mother of Narcissus (which see).

LEIS, *la' ees*. See HAWAII (The People).

LEITH, *leeth*. See SCOTLAND (The Cities).

LELAND, CHARLES GODFREY (1824-1903), an American who acquired fame as a humorist, poet, journalist, and miscellaneous writer. After graduation at Princeton University, in 1845, he studied in Europe, at Heidelberg and Munich, and later in Paris. He was in the latter city during the revolution of 1848, and was a member of the American delegation appointed to congratulate the new government on its success. Leland returned to Philadelphia, studied law, and in 1851 was admitted to the bar.

During his student years he had been a prolific writer, and this work he continued with such promise of financial independence from it that he soon abandoned the law and gave his time entirely to literature. One of his greatest successes was *Hans Breitmann's Ballads*, written in Pennsylvania Dutch and filled with humorous phrases and amusing adventures. So strongly did this appeal to the people that Leland himself came to be called Hans Breitmann, but he refused to adopt this pseudonym.

He spent much time in New York, established in Boston the *Continental Magazine*, in which he advocated the emancipation of slaves, and passed two years in London studying the Gypsies. He wrote several books relating to these people.

LELAND STANFORD JUNIOR UNIVERSITY, now known as Stanford University (which see).

L'ELYSEE, PALAIS DE, *lay le za', pah la' duh*, the official residence of the President of France. See PARIS.

LEMAN, *la mahn'*, LAC. See SWITZERLAND (Famous Lakes: Geneva).

LE MANS, *la mah N'*. See FRANCE (Interesting Cities).

LEMBERG, locally known as LWOW. See POLAND (The Cities).

LEMMING, a name applied to several small rodents of the mouse tribe, of which the

best known is the lemming of Norway and Sweden. This species is interesting chiefly because of its periodical migrations. At intervals of five to twenty years, countless hordes of the lemmings come down from their mountain homes and cross the cultivated fields, going west toward the Atlantic or east toward the Gulf of Bothnia. Living on the land and increasing as they go, they are regarded by the peasants as a veritable "plague of mice." Nothing stops them. They cross mountains, swim rivers, gnaw their way through haystacks, and traverse marshes. Thousands die from hunger, disease, fatigue, and accidents; others are killed by birds and beasts of prey. When the swimmers reach the sea, they plunge in and meet death by drowning. Many fanciful theories are offered to explain this apparent suicide. It is believed, however, that the migrations take place when food becomes scarce, and that the lemmings simply fare forth to more plentiful regions, following the dip of the land. Unaware of the width of the ocean, they perish through ignorance.

The Scandinavian lemming is about five inches long, not including its short, stubby tail. It is yellowish-brown with darker spots, and has a large head and short, thick legs. In winter the animals dig long galleries under the



THE LEMMING

snow in search of food. Related species are found in the Arctic regions of both hemispheres. See, also, ANIMAL (Migration of Animals).

W.N.H.

Scientific Name. Lemmings belong to the family Muridae. The Scandinavian lemming is *Lemmus lemmus*.

LEMMON CASE. See ARTHUR, CHESTER ALAN (Early Life and Rise to Power).

LEMNOS. See AEGEAN SEA.

LEMON, a valuable citrus fruit in common use in industry and the home. The lemon tree grows wild in India, and is now cultivated in Southern Europe, especially in Spain and Portugal, in Mexico, California, and, to a small



Photo: U & U

A GREAT INDUSTRY IN SICILY

One of the chief exports of the island is lemon and orange peel, for the making of marmalade. These fruits are first split in half, and then women and girls remove the pulp by hand. The rind is then packed in barrels for foreign trade. From some of the peel the oil is extracted, refined, and placed in huge flagons.

extent, in Southern Florida. It is not so hardy as the orange, and cannot endure frost, but in favorable locations it flowers nearly the year round, and ripens its fruit every month. Since 1895, when a severe cold spell badly damaged the lemon groves of Florida, the fruit has not been a leading crop in that state. With an annual yield of approximately 6,000,000 to 6,500,000 boxes, California produces over ninety-nine per cent of the total American crop. Fruit of high quality is produced in irrigated sections of that state.

The Tree. The lemon tree does not grow over twenty feet high. Its long, willowy branches are meagerly clothed with pale-green leaves, and the small, purplish-marked flowers are less fragrant than orange blossoms. It obviously is not so attractive a tree as the orange, to which it bears a close botanical relation. The two species are propagated and cared for in much the same way. In ordinary commercial practice, trees for orchard planting are grown from the bud on stock of the sour orange (see ORANGE).

The Fruit and Its Uses. The fruit of the lemon tree is classed by botanists as a berry. It is shaped like an egg, and its light-yellow outer rind has a rough appearance, which is due to the numerous oil glands embedded in

its surface. On the inside of the peel is a white, spongy, almost tasteless inner rind, while the whole interior of the fruit is filled with a juicy, sour, light-colored pulp. This is divided into ten or twelve sections, each of which contains two or three seeds.

Since lemons do not keep well if allowed to ripen on the tree, they are gathered while still green, and placed upon trays in cool, dark rooms. As the fruit slowly ripens, its rind becomes tougher, thinner, and more pliable, conditions which promise good keeping qualities during the process of shipping. On their removal from the curing rooms, the lemons are sorted, graded, wrapped in tissue paper, and packed in boxes.

Lemon extract, or oil, which is widely used for flavoring and as a basis for perfumes, is obtained by pressing the oil from the peel. The juice of the pulp, whose tart, agreeable flavor is due chiefly to the citric acid contained in it, has several uses. Cold lemonade is one of the most refreshing of summer beverages, and hot lemonade is highly valued for breaking up a cold. Lemon juice will restore the color to cloth discolored by alkali stains; its efficacy in removing such spots from the hands is well known. Medicinally, it has mildly laxative qualities. Calico-printers use it to

produce greater clearness in the white part of patterns dyed with colors containing iron, and it is also an important source of commercial citric acid (which see).
B.M.D.



THE LEMON

- (a) Cross section of fruit
(b) Flower
(c) Stamens and pistil
(d) Whole fruit

Above is a branch showing arrangement of leaves.

Classification. The lemon tree belongs to the family *Rutaceae*. Its botanical name is *Citrus limonia*.

LE MOYNE. See BIENVILLE, JEAN BAPTISTE LE MOYNE; IBERVILLE, PIERRE LE MOYNE.

LEMPA RIVER. See SALVADOR (Climate, Land, and Products).

LEMUR, le' mur, an animal allied to the monkey, but lower in the zoölogical scale than apes and monkeys, its brain being simpler in



THE LEMUR

structure. The typical lemur is about the size of a cat, with soft fur and long, bushy tail. The head is round, the eyes set in, and the nose so long and pointed that the animal has

been called the *fox-nosed monkey*. It lives in trees, and eats fruits, insects, small birds, eggs, reptiles, etc. Of the numerous species, the best-known include the *ring-tailed*, which is gray in color with black and white rings around its tail; the *ruffed*, one of the largest of the species; the *mouse lemur*, which is about the size of a rat; and the *indri*, which is black with white legs. The lemur is easily tamed and is very playful in captivity. The true lemurs are restricted to Madagascar and neighboring islands, but the name is applied to a large group extending to tropical Africa and India.

Lemur means *ghost*, a name given the animal on account of its spectral appearance and its weird movements and cry. Its howl resembles that of a dog, and the natives of Madagascar give it a name which means *dog of the forest*.
M.J.H.

Scientific Names. Lemurs belong to the family *Lemuridae*. The ring-tailed lemur is *Lemur catta*; the ruffed, *L. varius*; the mouse, *Cheirogaleus murinus*; the indri, *Indris indris*.

LENA RIVER, the main trade artery of a large district of Eastern Siberia. It rises on the slopes of the Baikal Mountains, 186 miles northeast of Irkutsk. Its entire length is 2,700 miles, the whole of which lies in Russian territory. At Irkutsk it attains a width of six miles, then flows north to the Arctic Ocean, where it forms a delta 250 miles wide. The chief tributaries are the Vitim, Kirenga, Olekma, Aldan, and Vilyui. The Lena becomes navigable at its junction with the Kuta River, about 430 miles from its source. Along its middle course the country is sparsely inhabited by Yakuts, a people who live by fishing. The river drains an area of about a million square miles, nearly equal to one-third the area of Canada. There is little fertile land along its northern course.

L'ENFANT, lahN fahN', PIERRE CHARLES. See DISTRICT OF COLUMBIA; WASHINGTON, D. C.

LENIN, len' in, NIKOLAI (1870-1924), whose real name was VLADIMIR ILYICH ULYANOV, was the guiding genius of the communist movement in Russia and the founder of the Soviet republic. He was a disciple of Karl Marx and thoroughly versed in all the doctrines of socialism.

Lenin was of good family, his father being a schoolmaster and his mother the daughter of a doctor. He was educated at Kazan University, and was admitted to the bar at Saint Petersburg (now Leningrad) in 1891. He practiced law for a short time at Samara, but his attention was chiefly devoted to the study of Marxism and to the promulgation of socialistic ideas. One of his brothers took part in the attempt on the life of Alexander III, and his execution for this offense undoubtedly had



Photo: Wide World

THE TOMB OF LENIN

In this imposing mausoleum repose the remains of the leader of the Russian revolution. It was built below the center of the Kremlin wall, facing the Red Square. The coffin rests inside a glass case, and the head of the former leader is visible to the public at all times.

a profound influence on Lenin's life and his views of government.

The defeat of Russia in the war with Japan (1905) increased the dissatisfaction of the people with their bureaucratic government. Strikes and political uprisings were met with drastic repressive measures, such as the shooting of the workers in Saint Petersburg in the strike of 1905. The government lost the confidence of the people, and had the support only of the soldiers and the official classes. Such a situation was fertile soil for the doctrines of such a thoroughgoing revolutionary as Lenin. He believed firmly in the rule of the masses as opposed to the classes, and he was willing to go all the way in putting his theories into effect.

From this time until the revolution of 1917, he published and circulated constant propaganda for his doctrines. Although exiled and imprisoned at various times, he did not cease to advocate the freedom of the people, the formation of revolutionary committees of workers, soldiers, and peasants, and the use of force against those in control of the government.

When the World War began, in 1914, Lenin undertook to give his ideas wider scope. He sought to unite the workers of all nations into a party of Social Democrats to work against their own governments. He denounced the war as imperialistic, and pointed out that its

purpose was the widening of markets and destruction of commercial rivals.

In November, 1914, he issued a manifesto which clearly shows the extreme character of his revolutionary views. It proposed the formation of an international party "to undertake the task of organizing the forces of the proletariat for the revolutionary attack on capitalist governments, for the civil war against the bourgeoisie of all countries, for the attainment of political power, and the victory of Socialism."

The views which he advanced were violently opposed by many members of his own party. His program was called "crazy," and he was accused of being under the control of the German general staff. He was obliged to withdraw to Finland and to carry on his campaign by letters, articles, and pamphlets.

The uprising against the government continued, and in October, 1917, a congress of the Soviets assumed the supreme power and placed Lenin at their head. The revolution spread quickly, and in order to control it, Lenin obtained the passage of a decree by the All-Russian Central Executive Committee setting up a dictatorship of the proletariat and dissolving the representative assembly. From this time forward, he was the directing force of the Soviet movement and the real head of the government, which was gradually estab-

lished. Administrative problems growing out of the war and the turbulent conditions in Russia occupied his every energy. New plans were needed to meet the emergencies which constantly arose.

In 1921 it was found necessary to adopt a "new economic policy" permitting private



Photo: U & U

NIKOLAI LENIN

Six of the eight men closely associated with Lenin during the years immediately following the Bolshevik revolution never attended school. The genius of this man in guiding the affairs of Russia is admitted even by his enemies.

buying and selling of goods, and fixing the government income by tax instead of by requisitioning supplies from the people, as had been done. These modifications of communistic ideas were not sufficient to secure the recognition of Great Britain and the United States, which was a serious blow to the new government.

In 1922 Lenin's health began to fail, and though he attempted to continue his work, his strength gradually declined until his death.

His funeral was the occasion of a general outpouring of respect and affection on the part of the people. He was regarded as the greatest figure of the revolution, and honored as the founder of the present Soviet régime in Russia.

Related Subjects. The reader is referred in these volumes to the following articles:

Bolsheviki	Soviet
Communism	Trotzky, Leon
Marx, Karl	World War
Russia (History)	(Russia's Catastrophe)
Socialism	

LENINAKAN, *len in' a kahn*, a city in Armenia (which see).

LENINGRAD, *len' in grad*, the old Russian capital whose present name is a tribute to the man who established the Soviet republic—Nikolai Lenin. Founded in 1703 by Peter the Great, and named SAINT PETERSBURG, the capital became in time the intellectual and social center of the great Russian Empire. In 1914, on the outbreak of the World War, it was a splendid city of over 2,000,000 inhabitants, the fifth city in Europe and the eighth in the world. Patriotic fervor caused its name to be changed to PETROGRAD, as soon as Russia entered the war, as the form *Petersburg* was too suggestive of things German. Following the Bolshevik revolution of 1917, the Soviet government abandoned the old capital in favor of the more centrally located Moscow. Petrograd sank to a city of minor importance, and by 1923, according to the urban census, its population had decreased to 1,067,328. In 1924, on the death of Lenin, the city was renamed in his honor, and the Soviet government announced that mail thereafter addressed to Petrograd would not be delivered. According to the official census of 1926, Leningrad in that year had a population of 1,611,102.

Location and Plan. Leningrad is located at the eastern end of the Gulf of Finland, 400 miles northwest of Moscow. The principal part of the city lies on the left bank of the Neva River, the remainder occupying the several islands formed by the branches of that waterway. The various parts of the city are connected by about 120 bridges, most of which span narrow canals. The Nicholas, the Troitsky, and the Alexander bridges are the finest specimens of bridge architecture in Russia.

The main part of the city is divided by three long avenues which radiate from the Admiralty, the center of the city. These are the Nevsky Prospekt, the Voznesensky Prospekt, and the Gorokhovaya Ulitsa. The Nevsky Prospekt is the principal thoroughfare of the city, and formerly was considered one of the handsomest avenues in Europe. It is about 130 feet wide and four miles long. In the pre-war days, it was there that the life of the cap-



Photo: U & U

FORTRESS OF PETER AND PAUL

It is situated on an island in the River Neva, and was the first building erected by Peter the Great when Saint Petersburg (now Leningrad) was planned. The czars used it as a place of detention for political prisoners, and that use was continued under the Bolshevik government.

ital was revealed in its most animated and picturesque aspects.

The Notable Buildings. After the early rule of the Bolsheviks and the removal of the government to Moscow (which see), only the shell of the old, majestic "City of Peter" remained. To add to the distress, there were disastrous floods in 1924 and a destructive fire in the same year. Luxurious palaces, handsome public buildings, parks, and boulevards fell into ruin within only a few years; and the extreme poverty of the people made it impossible to build up the pretentious city of old. Consequently, many of the magnificent buildings stand unused and empty as a reminder of past glory. Many are now being converted into Soviet rest homes, to which the workers are sent for free treatment or restful vacations at state expense.

Among the most important structures on the principal avenue are the Cathedral of Our Lady of Kazan, with its semicircular colonnade of Corinthian columns, the former Duma (or City Hall), the former Imperial Library, the Alexander Theater, the Anitchkov Palace, and the Anitchkov bridge over the Fontanka, a waterway 150 feet wide. Along the bank of the Great Neva, one of the arms of the Neva, extend palaces, private residences, and the imposing Admiralty. Here also are the Ministry of Marine building and the Marine Museum, which is nearly 1,600 feet long.

At the southwest corner of the Admiralty is the Cathedral of Saint Isaac, the most magnificent church in the city. On an island in the Great Neva is the Cathedral of Saints Peter and Paul, containing the tombs of the Russian rulers. The Winter Palace is the largest and in many respects the most celebrated royal palace in the world, and was the residence of the czar until his abdication in March, 1917; in 1925 the roof collapsed over two of the halls. It was designed and built by three empresses, Anna, Elizabeth, and Catharine II, and contains a bewildering assemblage of apartments, adorned with many paintings and sculptures of great value. When fully occupied, the Winter Palace has accommodated 6,500 people. Adjoining the palace is the Hermitage, once one of the leading art galleries of the world, containing until within recent years a priceless collection of paintings and Greek and Roman sculptures. Near by is the so-called Marble Palace, erected by Catharine II. South of the Summer Garden is the Russian Museum, devoted to Russian art. On Vasilevsky Island, facing the Admiralty, are the Bourse, the University of Leningrad, the Academy of Sciences, the Academy of Arts, including a museum, and the Samenoff Gallery, rich in works of French and Dutch art. The fortress of Peter and Paul, now used as a state prison, is on a small island and stands beside the cathedral bearing

Questions on Leningrad

(An Outline suitable for Leningrad will be found with the article "City.")

What and where is the largest palace in the world?

How many people can be housed in this structure?

In what sense can it be said that Leningrad is a seaport?

For whom was the city named? By what other names has the city been known?

What very important dramatic event took place in 1917?

How did the city compare in population with the cities of the other great European nations before the World War?

In what did Peter the Great live while he was laying out his future capital?

How does the former Imperial Library compare in number of volumes with the Bibliothèque Nationale? With the library of the British Museum? With the Library of Congress?

What are called the finest specimens of bridge architecture in Leningrad?

What is the principal thoroughfare of the city?

Who were responsible for the building of the greatest palace in the world?

the same name. Near by, on another small island, is the little wooden house in which Peter the Great lived when he began to build this capital city.

Education. Few cities are as highly favored with educational and scientific institutions and learned bodies. At the head of its educational



Photo: Wide World

A WORKER'S CLUBHOUSE

It is exclusively for the workmen of the city and their families; the intellectual classes are excluded.

system stands the University of Leningrad, with over 4,000 students in normal years. There are numerous other educational institutions, which since the revolution have been administered by the People's Commissariat for Education, the highest educational authority.

The academy of arts, musical schools, scientific societies, and libraries have all been taken over by the Commissariat. The former Imperial Library has one of the largest collections in the world, exceeding 2,000,000 books and 124,000 manuscripts. The Academy of Sciences has a library of over 500,000 volumes, and that of the university has nearly as many. At Pulkova, ten miles southwest of the city, is one of the leading observatories of the world.

Industry and Commerce. Leningrad with its suburbs forms the second great industrial center of Russia, being exceeded only by Moscow. The chief manufactures include a long list of staple articles, though the factories are far less numerous than before the revolution. Printing and publishing is an extensive industry, and Leningrad is the chief seat of the Russian book trade.

Both foreign and domestic commerce are extensive. In 1885 a ship canal to Kronstadt was completed, making the city a seaport. Railways and canals connect the city with all parts of the interior. Although it is now Russia's only Baltic harbor, much of the country's trade is conducted through the foreign ports of Reval in Estonia, and Riga and Libau in Latvia. As a port, Leningrad is one of the best in the world, and its equipment is now back to pre-war standards. The largest ice-breakers in the world are used here.

LENNEP, JAKOB VAN. See NETHERLANDS, THE (Language and Culture).

LENNI LENAPE, len' ih len' ah pe. See INDIANS, AMERICAN (Most Important Tribes: Delaware).

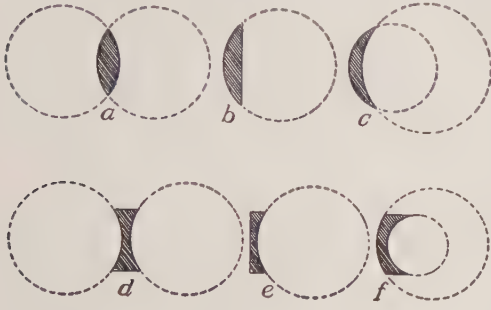
LENS, lenz, a transparent substance, having at least one curved surface. Lenses thickest in the middle are convex; those thickest at the edges are concave. The six kinds of lenses are shown in the accompanying figure, and there is also an explanation of their forms.

When a ray of light passes through a lens, it is bent towards the thickest part. Accordingly, light rays passed through a convex lens tend to meet in a point, or *focus*. Parallel rays such as *a, b, c, d* (Fig. 2), passing through the double-convex lens *X Y*, converge at *M*, the *principal focus*. A familiar illustration is furnished by the burning glass, which brings the sun's rays to a point, so concentrating their heat as to ignite inflammable substances.

Images produced by convex lenses are of two sorts—*real* and *virtual*. A ray passed through the optical center (Fig. 3) of a lens is not bent. Such rays are called *axial*. The principal axis *L N* passes through both the optical center and the principal focus *H*. All rays parallel to the principal axis are so bent as to pass through *H*. Where *R P* crosses the axial ray at *R*, the image at *r* is found. Similarly, *Q* is found at *q*. The resulting image is inverted and *real*, as the light rays really travel

to, and unite to form, such an image. It is smaller or larger than the object, according as the object is at a distance greater or less than twice the focal length CH .

When the object is nearer the lens than the focal distance GL (Fig. 4), the image appears



LENSES

The six forms of lenses. The first three are *converging* lenses, thicker in the middle than at the edges; the lower three are *diverging*, thinner at the middle than at the edges:

- (a) Double-convex—both surfaces convex.
- (b) Plano-convex—one surface convex, one plane.
- (c) Concavo-convex—one surface convex, one concave.
- (d) Double-concave—both surfaces concave.
- (e) Plano-concave—one surface concave, one plane.
- (f) Convexo-concave—one surface concave, one convex.

on the same side as the object, erect and magnified. Such an image is called *virtual*.

The parallel rays from N and R are bent, and meet at the focal point G . The rays LN

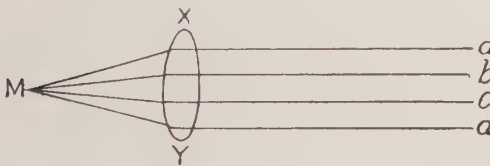


Fig 2

and LR , being axial, are not refracted. The image NR appears where the axial rays meet the refracted parallel rays, which is on the

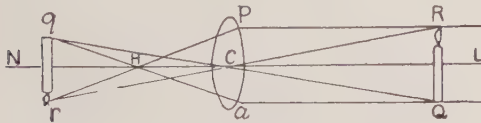


Fig 3

same side as the object. The illustration shows the use of the double-convex lens as a magnifying glass. Images formed by concave lenses are erect, virtual, and smaller than the object. Thus the reducing glass is exactly the opposite of the magnifying glass, being double-concave instead of double-convex.

A.L.F.

Related Subjects. The following articles in these volumes will be of interest in connection with a study of lenses:

Aberration
Camera
Diffraction
Ether
Fluorescence
Light
Microscope

Mirror
Polarization of Light
Physics
Reflection
Spectroscope
Spectrum Analysis
Telescope

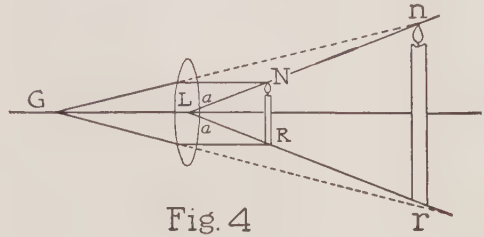


Fig. 4

LENT, from the old English word *lenten*, meaning *spring*, is the season of fasting which begins with Ash Wednesday, forty days before Easter, and ends with Easter Sunday. It is observed somewhat strictly by the Roman Catholic, the Eastern, and the Anglican churches, but the evangelical Protestant churches are more and more recognizing Lent as a season of special observance, and are giving expression to this idea by holding religious meetings. In modern times, much latitude is allowed in the observance of Lent, the age, health, and occupation of individuals being taken into account.

Lent was originally a fasting period of thirty-six days. In 487 Felix III added four days to it, to make it correspond to Christ's forty days of fasting in the Wilderness.

[See EASTER, for explanation of movable feast dates.]

LENTIL, an ancient food plant, one of the first cultivated by man. It is said that from the lentil found in Egypt was made the pottage for which Esau gave his birthright. It belongs to the leguminous family of plants, which bear seeds in pods, like the pea and bean, and there are varieties with red-brown, grayish, and black seeds, respectively. The plant thrives best in light, dry soil, as rich soil yields few pods. The European countries bordering on the Mediterranean Sea, Egypt, and Western Asia produce the greatest supply.

The seeds are the part used for food. They are of various sizes, never growing larger than half an inch in diameter. They can best be described as lens-shaped, but the lens itself was so named because of its lentil-like shape (see LENS). Lentil seeds have a pronounced flavor, and are among the most nutritious of legumes, being rich in protein and carbohydrates. They are used for the most part in

making soup. Excellent fodder for sheep, horses, and cattle is provided by the vine. Lentils have never become popular as table food in the United States, as Americans prefer peas and beans. B.M.D.

Scientific Name.
The botanical name of the lentil is *Lentilla lens*.

LENTO. See MUSIC (A Course of Lessons: Tempo).

LEO, the name of thirteen Popes. Among these was Leo XIII, one of the greatest occupants of the Papal chair. Several others won for themselves permanent places in history.



LENTIL, BRANCH AND SEED

Leo I, known as Saint Leo, was Pope from 440 to 461. Even before his accession he was recognized as one of the foremost of the Church "fathers" and his election aroused general enthusiasm. He regarded himself as universal bishop and attempted to use his strong position to put down a heresy which had gained considerable headway, but in vain. In secular history, Leo I bears a dramatic part. When Attila I invaded Italy, Leo, commissioned by the Emperor Valentinian, went to meet him and induced him to spare the city of Rome. Later, when another raid threatened under Genserich, the Pope persuaded the Vandal chief to refrain from burning the city and putting the inhabitants to death. See ATTILA; GENSERIC.

Leo III, Pope from 795 to 816, is chiefly memorable as the pontiff who crowned Charlemagne and so assisted in founding the Empire of the West. His rule was much disturbed by various outbreaks, and in 799 he besought the protection of Charlemagne, who in the next year visited Rome. In return for the Pope's services, Charlemagne guaranteed his temporal sovereignty over the States of the Church, with the understanding that the emperor should retain a protectorate over them.

Leo IX, who reigned from 1048 to 1054, was a cousin of Emperor Conrad II. A man of learning and of upright life, he strove to reform abuses in the Church, opposing simony, or traffic in sacred things, and insisting upon the celibacy of the clergy. He traveled in France, Italy, and Germany, holding councils and laboring to strengthen Church authority. In 1053 he was taken prisoner by the Normans in Southern Italy, and held in honorable captivity until a few weeks before his death.

Leo X was of the famous family of the Medici, a son of Lorenzo the Magnificent. He was born in Florence in 1475, made a cardinal at the age of thirteen, and after some years spent in travel and in study, was chosen Pope in 1513. Before all else, Leo X was a scholar and a patron of learning. He chose

scholars for high positions at his court, and made Rome the center of the artistic and literary world, as it had long been the center of the religion of the Roman Catholic world.

But his reign was by no means without political significance. In order to gain funds for the rebuilding of Saint Peter's, he permitted the preaching of indulgences, and this was one of the things which roused the active opposition of Martin Luther and led to the outbreak of the Reformation (which see). Leo issued a bull against Luther in 1520, which the reformer burned, but it does not appear that the Pope ever viewed the Reformation seriously.

Leo XIII (1810-1903) had one of the longest reigns in the history of the Papacy, from 1878 to 1903, and proved himself a most active and enlightened pontiff. He was born at Carpineto, Italy, his name until his elevation to the Papal throne having been Gioacchino Vincenzo Raffaello Luigi Pecci. After studying in the Jesuit College at Viterbo and in Rome, in 1837 he was ordained a priest and named domestic prelate to Pope Gregory XVI. Later he was delegate at Spoleto and at Perugia, and in 1843 was made archbishop of Damietta.

In 1846 he was consecrated archbishop of Perugia, and there he remained until 1878, having in the meantime (1853) been created cardinal. When Pope Pius IX died, in 1878, the cardinal was elected his successor, at the age of 68. His reign was a most notable one in the history of the Church. He restored the hierarchy to Scotland, established one in India, and brought to a triumphant conclusion the religious struggle with Germany. A man of great moderation, he constantly urged Catholics in all parts of the world, notably in Canada and in Ireland, to refrain from opposition to their legitimate governments, but he never could bring himself to recognize the authority of the Italian government over Rome, and to the last regarded himself as a prisoner in the Vatican.

G.W.M.

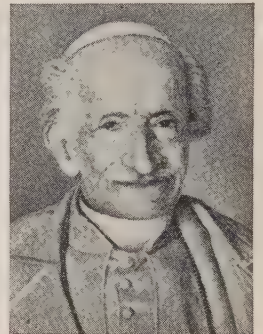


Photo: P & A

LEO XIII

LEO, THE LION, the fifth zodiacal constellation, occupying the sign of Virgo. This is one of the oldest of constellations, and was described as a lion in the oldest-known zodiac. The principal star in this constellation is Alpha Leonis or Regulus, sometimes called *Cor Leonis*, or the *heart of the lion*. It is a star of the first magnitude, the stars Beta and Gamma being of second magnitude. There are ninety-five stars in this constellation, many fine double stars, and several nebulae.

Leo is the fifth sign of the zodiac, between Virgo and Cancer, and is entered by the sun about July 23 (see ZODIAC). The astronomical symbol is ♌, the origin of which is not quite clear, though it has been suggested that it represents either the breastbone or the tail of the lion.

F.B.L.

TS

BUSINESS

BUSINESS

TRANSPORTATION

GEOGRA



